

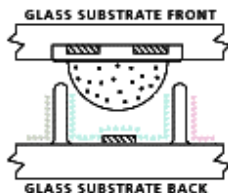
Materials by: Alvie Rodgers C.E.T. and Danny Newman

HITACHI PLASMA DISPLAYS

32HDT20 42HDT20



HITACHI
Inspire the Next



Instructor: Alvie Rodgers C.E.T.

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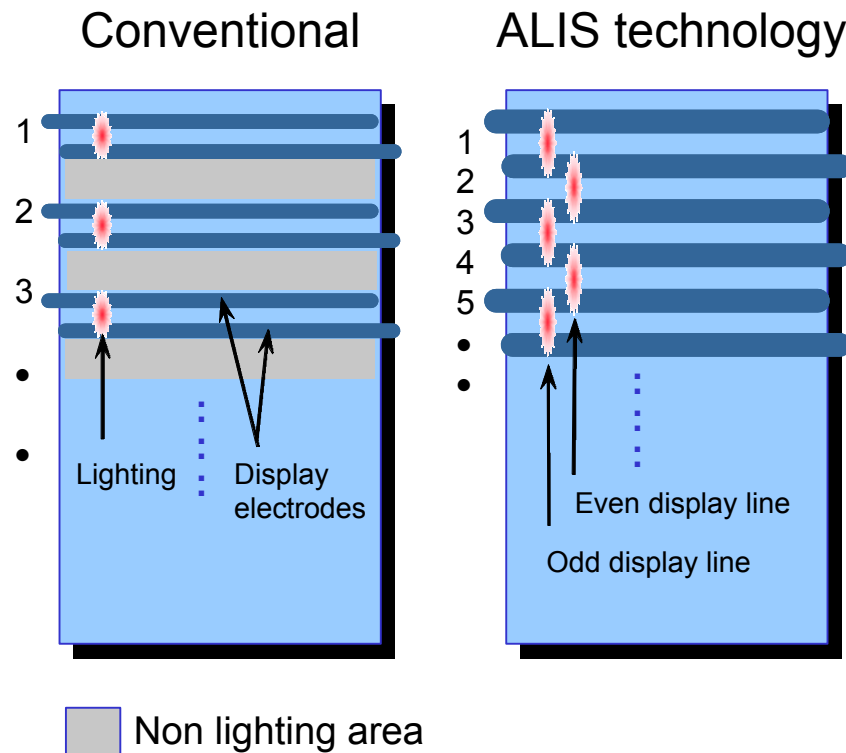
SECTION ONE

(1)

BASICS

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ALIS Technology (Alternate Lighting of Surfaces Technology)



Challenges

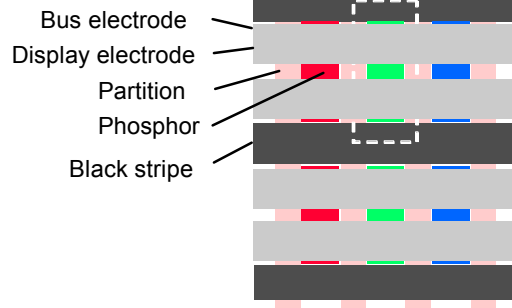
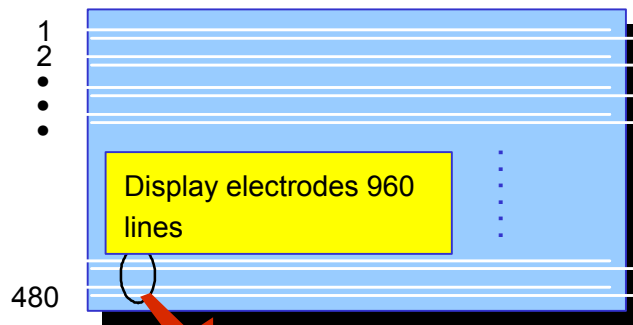
To increase the resolution without reduced brightness

Innovations

- Use the non-lighting area between electrodes
- Odd / Even lines to be separately displayed with time difference
- Realize 1000 lines by VGA level of electrode numbers
(display line number +1 = number of electrodes)

Challenges with Panel Design

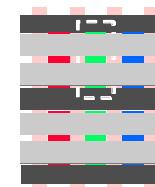
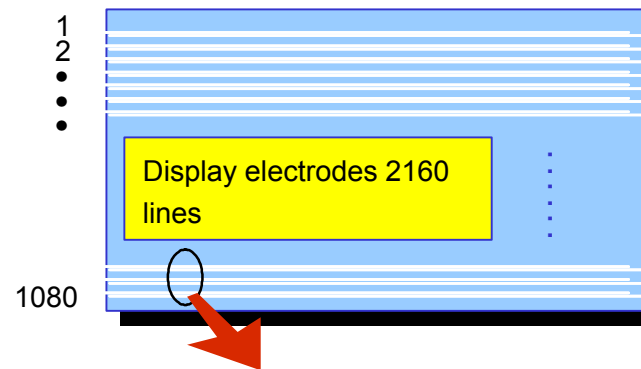
Wide VGA (852 x 480 pixels)



Cell size 1.08 x 0.36mm

Cell aperture ratio 40%

HDTV (1920 x 1080 pixels)



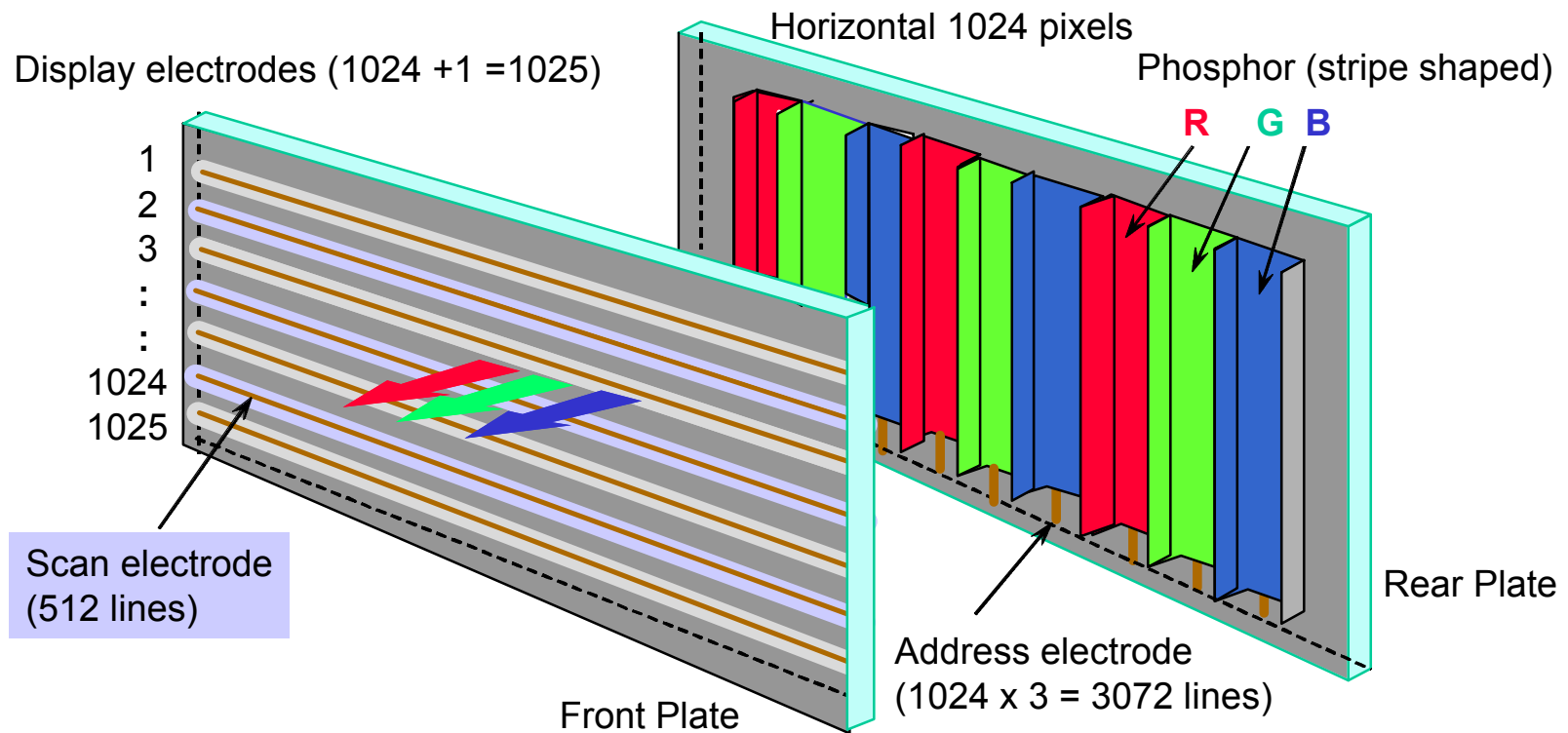
Cell Size 40 to 20%

Cell aperture ratio
less than 30%

- Double number of electrodes → Further high precision processing and equipment need to be developed.
- Reduced cell aperture ratio → Brightness need to be increased further.



Panel Structure of ALIS Technology PDP (1024 x 1024 pixels)

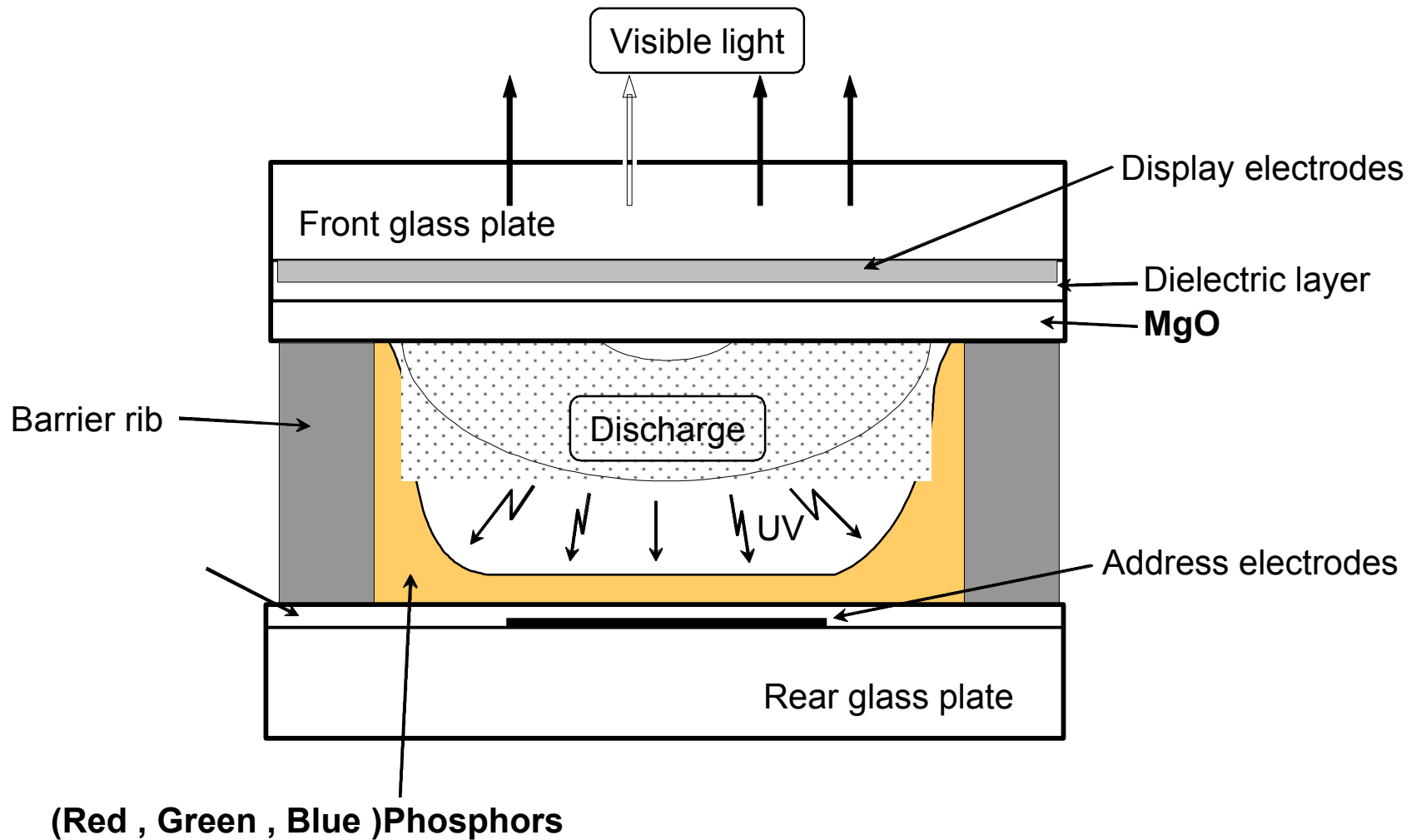


Same rear plate as conventional type

3-2; Comparison between PDP and CRT

No	ITEM		CRT	PDP
1	Display Method	Luminous Source	Phosphor	Phosphor
		Excitation Matter	Electron Beam	Ultra-Violet Ray by Gas Discharge
		Excitation Source	Cathode	MgO
2	Control Method	Brightness	Beam Current	Discharge Frequency
		Chromaticity	R/G/B Phosphor	R/G/B Phosphor
		Focusing	Focus Voltage	Fixed (none)
3	Life	Brightness	Phosphor Degradation Emission Decrease Burn-in (PbO -> Pb)	Phosphor Degradation MgO Damage (Dot Defect)

2-1-3; Principle of Color PDP



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SECTION TWO

(2)

HOW PLASMA WORKS

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HOW DOES A PLASMA DISPLAYS WORK

Plasma displays work on the principle that passing a high voltage through a low-pressure gas generates light. Displays based on this have been around since the earliest days of electronics--the picture on John Logie Baird's first television was created by mechanically scanning a neon bulb. More recently, neon-based monochrome displays have been used on a few mains-powered portable PCs from Compaq, Grid and IBM. These had a grid of wires in a sea of gas; when a high voltage existed between a column and a row wire, the gas became incandescent and the pixel lit up.

The major advantages were that it was thin and bright and had a fast response time. Against that, it was very power hungry and the control electronics needed to switch high voltages quickly; as soon as LCDs stopped being dim, smudgy and expensive, the plasma display was pensioned off.

Now a new breed of plasma displays is catching the eye. By having a mix of gases that emit ultraviolet light and coating the inside of the display with different colored phosphors, full-color images can be created. Because a plasma pixel is simple it's easy to make large displays. Currently, 40in. displays are available for around £8,000. However, the resolution on these is low--typically 640 by 480--and the power consumption in the hundreds of watts. They're most suitable for video and television applications.

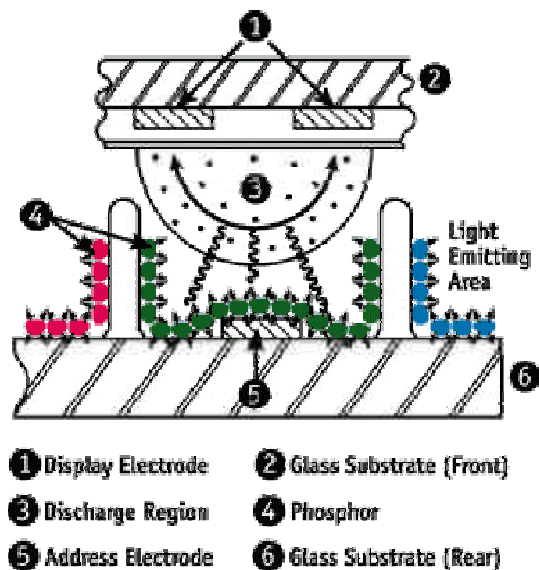
How does a plasma display work?

Plasma monitors work much like CRT monitors, but instead of using a single CRT surface coated with phosphors, they use a flat, lightweight surface covered with a matrix of tiny glass bubbles, each containing the gas-like substance, plasma, and having a phosphor coating. Each of the "pixels" in this matrix is actually comprised of three sub-pixels, corresponding to the colors red, green and blue.

In a CRT monitor, an electron beam is fired from the rear of the long picture tube, hitting the phosphors on the front surface which makes them glow. Complex circuitry and high voltage deflections coils are required to aim, focus and move the beam to create an entire image.

Plasma displays eliminate the need for high voltage deflection coils and the long neck of a CRT. In a flat plasma monitor, a digitally controlled electric current flows through the appropriate parts of the matrix, causing the plasma inside the bubbles to give off ultraviolet rays. These rays in turn cause the bubbles' phosphor coatings to glow the appropriate color.

*Plasma display diagram, courtesy of Fujitsu General America, Inc.



PLASMA DISPLAY TECHNOLOGY

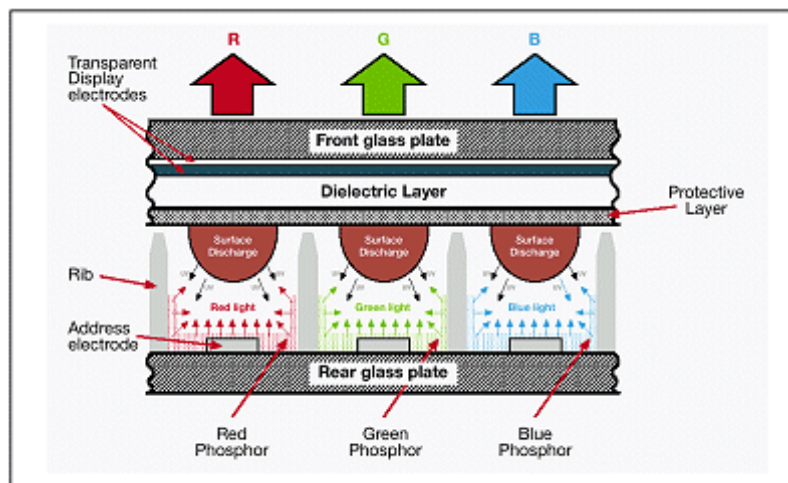
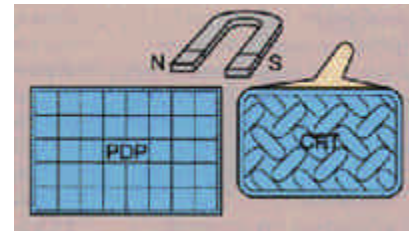
Plasma Display Technology

Plasma Displays work by applying a voltage between 2 transparent display electrodes on the front glass plate of the display. The electrodes are separated by an MgO dielectric layer and surrounded by a mixture of neon and xenon gases. When the voltage reaches the 'firing level', a Plasma discharge occurs on the surface of the dielectric resulting in the emission of ultra violet light.

This UV light then excites the phosphor material at the back of the cell and emits visible light. Each cell or sub-pixel has red, blue or green phosphor material and 3 sub-pixels combine to make up a pixel. The intensity of each color is controlled by varying the number and width of voltage pulses applied to the sub-pixel during a picture frame. This is implemented by dividing each picture frame into sub-frames. During a sub-frame, all cells are first addressed – those to be lit are pre-charged to a specific address voltage – then during the display time the display voltage is applied to the entire screen lighting those which were addressed.

Each sub-frame has a weighting ranging from 1 time unit to 128 time units for a typical eight sub-frame arrangement (Time Unit depends on size and number of pixels on the screen). This is a purely digital PWM control mechanism, which is a key advantage as it eliminates any unnecessary digital to analogue conversions, making the PDP technology ideal for the all-digital age. This so-called 3 Electrode Surface Discharge method was developed and patented by Fujitsu as far back as 1984 while the Address/Display Separated (ADS) was patented in 1990.

- Brilliant picture quality
- Fully flat, large screen formats
- Thin (40mm) – suitable for wall hanging
- 16.7 million colors for natural colors reproduction
- High brightness, high contrast
- Wide viewing angle 160° – in all directions
- Fully digital internal operation
- Light weight – 1/6 th of CRT
- Unaffected by magnetic fields
- Fully flicker-free operation



HIGH RESOLUTION IN PLASMA DISPLAYS

Achieving High Resolution

While conventional technology, as found in standard VGA resolution screens, uses 2 display electrodes for each horizontal line, applying the same method to achieve higher resolution (>1000 horizontal lines) brings inherent problems. Firstly, the number of electrodes would need to be doubled which would require very high precision production processes. Secondly, the cell aperture ratio would reduce resulting in lower brightness. In addition, the driving scheme would either have to operate with double the speed, again introducing significantly higher cost or a dual-scan technique would have to be introduced. With dual-scan, twice as many driving ICs would be required. In summary, implementing high resolution with conventional technology would result in lower brightness and increased costs.

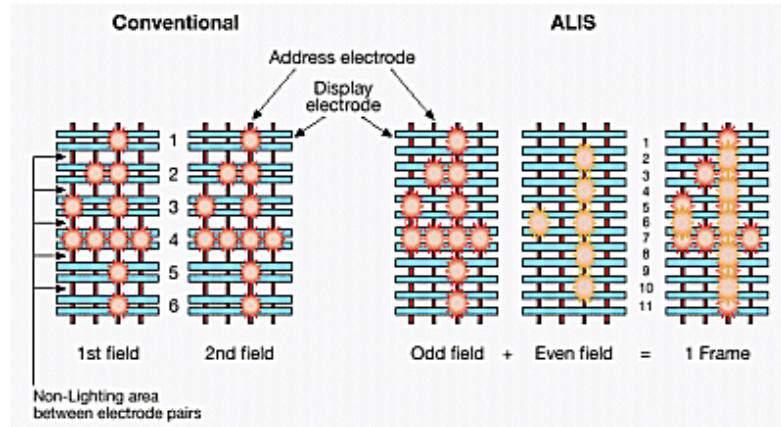
ALIS Technology

To achieve high brightness as well as cost-effectiveness, FHP developed ALIS (Alternate Lighting of Surfaces) Technology. ALIS is based on 3 principles:

1. Odd and Even lines are displayed separately
2. The non-lighting area between the cells is utilized
3. The number of electrodes = the number of horizontal display lines + 1

Despite the smaller cell size, the aperture ratio can be increased from 40% to 65% meaning that the screen is inherently brighter.

Another spin-off benefit is that the lighting duty is reduced to 50% (odd fields and even fields lit for half of each frame) meaning that a significantly improved phosphor lifetime can be expected. To summarize, ALIS allows cost-effective realization of high resolution, high brightness plasma display panels. It is FHP's latest major innovation in advancing PDP technology.



ALIS high-resolution, high brightness PDP

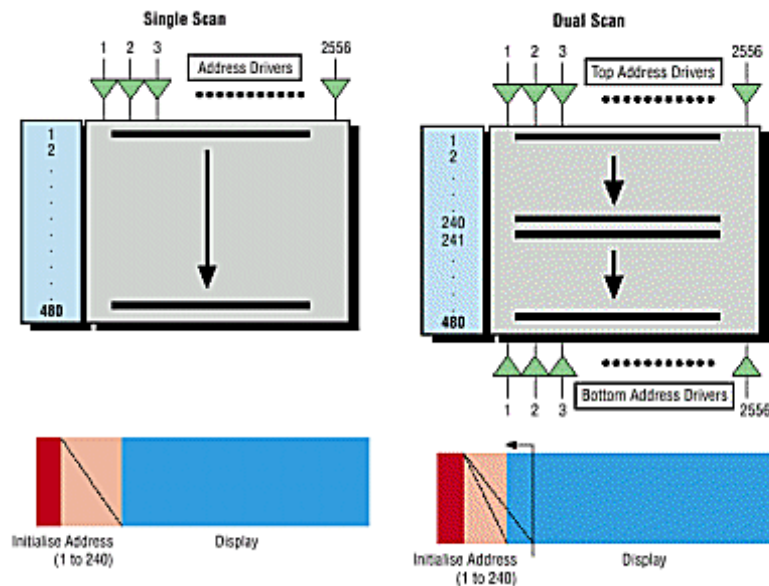
Features of ALIS

- High Resolution
 - 2 times higher resolution by same number of electrodes
- High Brightness
 - Brighter than VGA type, even with over 1000 lines
- Low cost Panel
 - Production by current VGA panel process
 - Number of driving circuits reduces to 1/2
- TV/PC support
 - Connectable to current TV signal (interlace) without scan conversion
 - Possible to support PC signal (Progressive)
- Less Flicker
 - Less flicker as compared to CRT
- Low Noise
 - Low EMC noise level by both direction driving method
- High reliability
 - Longer life by lighting duty of 1/2

PLASMA DISPLAY TECHNOLOGY

Notes on Plasma Display Technology

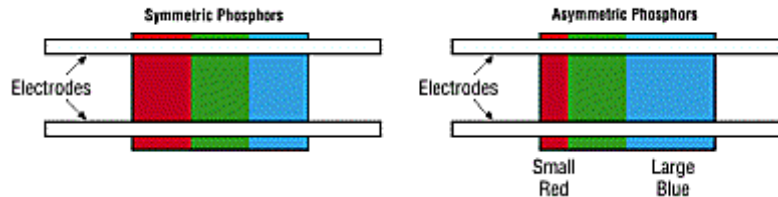
Single Scan Technology - optimized trade-off between brightness, lifetime and cost There are 2 basic driving schemes possible for PDPs - single scan and dual scan addressing. In single scan, all the cells on the screen are addressed before the display phase is entered. This requires just one set of address drivers on the PDP and so saves cost. In dual scan the screen is divided for addressing into the top half and the bottom half. This requires 2 sets of drivers at the top and bottom of the PDP which obviously increases the cost of the panel. In dual scan the address time is half that of single scan so there is more time available for the display phase. This means that it is easily possible to increase the number of display (sustain) pulses applied to the PDP in the display phase. This results in increased peak brightness but also increases power consumption and reduces phosphor lifetime which can be a critical issue for some applications. FHP PDPs use single scan technology which gives the optimal trade off between brightness, lifetime and cost. Therefore FHP is continuously developing high speed driving methods and picture control schemes with minimized cost. ALIS is also a single scan technology.



HOW DOES PLASMA DISPLAYS WORK (Notes)

Symmetric phosphors - The Reliable Choice

In symmetric phosphors, the red, green and blue sub-cells are all the same size. In an asymmetric arrangement the blue phosphor is usually larger and the red smaller. The reason for choosing the latter arrangement is that blue makes a greater contribution to color temperature. When blue is brighter, it is possible to use brighter red and green so the panel is brighter. However the asymmetric arrangement has major disadvantages in terms of manufacturing cost and lifetime.



The reason is that due to the different cell size there is a reduced drive margin (i.e. the voltage range within which the cell will light). This results directly in lower yield in production which increases cost. As it is also expected that the drive margin will change over the operating time, there is a potential impact on the reliability of the panel operation. Due to the above reasons FHP only uses symmetric arrangement to achieve the stable drive margin. FHP has also developed an improved panel process to achieve a high color temperature.

ADVANTAGES OF PLASMA DISPLAY

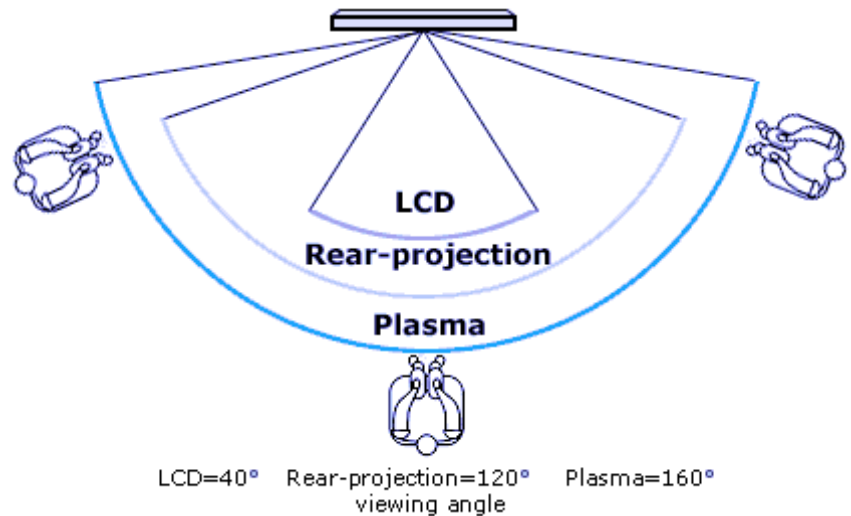
Razor-sharp image clarity, rich vibrant color and shades of gray, sleek design -- there are so many features that make plasma so cool.

Digital Convergence

High-resolution data display for sharp imagery combined with excellent video capability for smooth movement. A 16:9 aspect ratio, and most, but not all, are compatible with DTV/HDTV.

Flat is Where It's At

No optics means no image distortion, even at edges and corners. Plasma displays a bright, uniform image in normal room light with an amazing 160-degree viewing area from all sides.



Thin By Design

An astonishing 3 to 6.5 inches thick, plasma can hang anywhere without interfering with room traffic. It's super sleek design may be unassuming, but it definitely makes a statement.

And more...

- No viewing angle limitations
- No projection "throw distance" limitations
- High ambient light tolerance
- Accurate, distortion free images
- Video, computer and HDTV compatible
- Completely digital
- Unaffected by magnetism
- Extremely bright, for clear display in any light
- Thin profile saves space
- Free-standing, or can be mounted to a wall or ceiling

Plasma vs. CRT

- Clearer and sharper picture from edge-to-edge
- Uniform brightness on any area of the screen
- Flicker-free images
- Consume less power

Plasma vs. LCD

- Brighter picture
- Wider viewing angle
- Better color purity
- Higher contrast ratio

SECTION THREE

(3)

PRODUCT

FAMILURIZATION

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PLASMA PICTURES



This picture shows the 32HDT20 with the A/V unit which is included.



This picture shows the 42HDT20 with the A/V unit which is included.

**32HDT20 and 42HDT20 PLASMA UNIT'S
AUDIO VIDEO CONTROL CENTER**

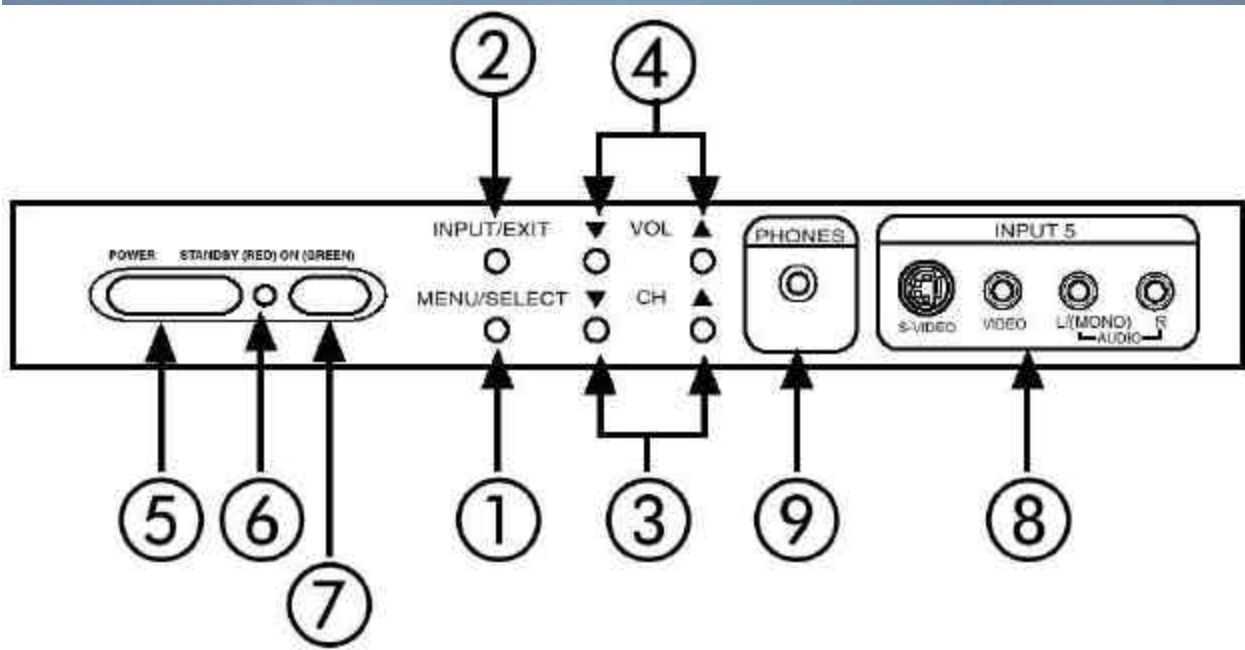


This picture shows the 32HDT20 and the 42HDT20 Audio Video Control Center.



This picture shows the 32HDT20 and the 42HDT20 Audio Video Control Center with the front control door open.

32HDT20 and 42HDT20 PLASMA UNIT'S AUDIO VIDEO CONTROL CENTER



32HDT20 and 42HDT20 PLASMA UNIT

A/V CONTROL CENTER BUTTON EXPLANATION

FRONT VIEW

(1) MENU/SELECT button

- This button allows you to enter the MENU, making it possible to set TV features to your preference without using the remote. This button also serves as the SELECT button when in MENU mode.

(2) INPUT/EXIT button

- Press this button to select the desired input, VIDEO: 1, 2, 3, 4, 5 or Ant A, Ant B source. Your selection is shown in the top right corner of the screen. This button also serves as the EXIT button when in MENU mode.

(3) CHANNEL selector

- Press these buttons until the desired channel appears in the top right corner of the TV screen. These buttons also serve as the cursor down () and up () buttons when in MENU mode.

(4) VOLUME level

- Press these buttons to adjust the sound level. The volume level will be displayed on the TV screen. These buttons also serve as the cursor left () and right () buttons when in MENU mode.

(5) POWER button on the PLASMA UNIT.

- **Display Monitor "MAIN POWER" button**
- This power button is for the complete system, and must be turned ON/OFF manually. It is recommended to leave the "MAIN POWER" to ON condition (lights red) for stand-by mode.

(5) AVC POWER button on the AV Unit.

- The AVC power button can be turned ON/OFF manually or by remote control. Turning on the AVC Power will only turn on the AVC box if the "MAIN POWER" of the display monitor is off.

(6) POWER light indicator

- To turn the monitor ON, press the main power switch located on the lower right side of the monitor. A red stand-by indicator lamp located on the lower right corner of the front bezel will illuminate. The PDP is now ready for remote on/off operation.

Indicating Lamp	Power Status	Operating
Off	Off	When the main power switch is set OFF. The main power switch must be turned on manually.
Lights Red	Off (Stand-by)	When the main power switch on the display monitor is ON, and the AVC Center is OFF.
Lights Green	On	Display monitor MAIN POWER is ON and AVC Center power is ON.
Lights Orange	Off (Power Saving)	Display monitor MAIN POWER is ON and AVC Center power is ON, but no signal input (no sync. signal).

32HDT20 and 42HDT20 PLASMA UNIT

A/V CONTROL CENTER BUTTON EXPLANATION

(7) REMOTE CONTROL sensor

- Point your remote at this area when selecting channels, adjusting volume, etc.

(8) FRONT INPUT JACKS (for VIDEO: 5)

- Use these audio/video jacks for a quick hook-up from a camcorder or VCR to instantly view your favorite show or new recording.
- Press the VID5 button on the remote control button and VIDEO: 5 appears in the top right corner of the TV screen. If you have mono sound, insert the audio cable into the left audio jack.

(9) PHONES JACK

Use this phone jack for your head-set or ear phone set for private listening.

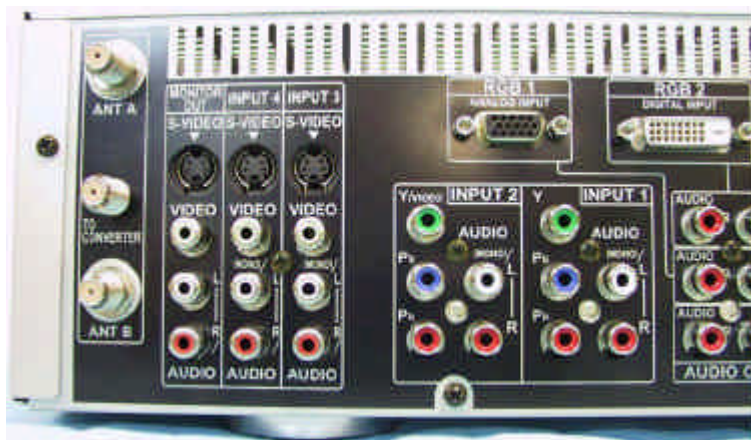
NOTES:

- *Your HITACHI Plasma TV will appear to be turned OFF if there is no video input when VIDEO: 1, 2, 3, 4, 5 is selected.*
- *Check the Power Light to make sure the Display Monitor is turned off or in Stand-by mode (lights red) when not in use.*
- *Remote Control can not turn ON/OFF the "MAIN POWER" of the display monitor.*

32HDT20 and 42HDT20 PLASMA UNIT A/V CONTROL CENTER REAR INPUTS EXPLANATION



This picture shows the 32HDT20 and the 42HDT20 Audio Video Control Center Rear connections view. The NEXT page show a close up of each section of the Rear panel connections.



This picture shows the 32HDT20 and the 42HDT20 Audio Video Control Center Rear RGB connections close-up view. Note that the RGB 2 input is a specific Digital Video style connector. This is the same style as the connector that goes to the Plasma Display. Be careful not to connect the Plasma Display to this connector. If this happens, unplug the A/V Unit, unplug the connector and plug into the correct connections, then wait at least 30 seconds before re-applying power.

This picture shows the 32HDT20 and the 42HDT20 Audio Video Control Center Rear RGB connections close-up view. Note that the RGB 2 input is a specific Digital Video style connector. This is the same style as the connector that goes to the Plasma Display. Be careful not to connect the Plasma Display to this connector. If this happens, unplug the A/V Unit, unplug the connector and plug into the correct connections, then wait at least 30 seconds before re-applying power.



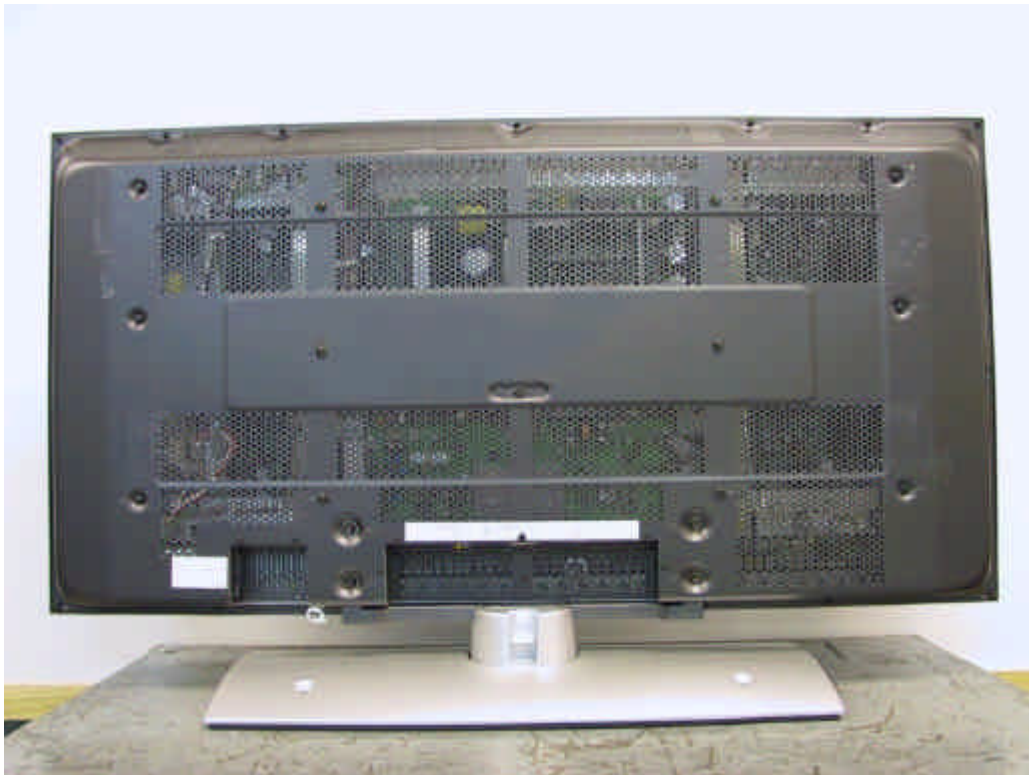
This picture shows the 32HDT20 and the 42HDT20 Audio Video Control Center Component connections close-up view. Note that Component 2 Input will accept Composite inputs into the Y jack. However, Input 1 will only accept Component.



32HDT20 PLASMA UNIT



This picture shows the 32HDT20 Plasma Unit Front View.



This picture shows the 32HDT20 Plasma Unit Rear View.

32HDT20 PLASMA UNIT



This picture shows the 32HDT20 Plasma Display Unit connectors between the A/V Unit and the Plasma Unit. Note: This connector will not accept any other input than the A/V Unit. Do not plug any connectors from external equipment into this connector.

This picture shows a close up view of the 32HDT20 Plasma Display Unit connectors between the A/V Unit and the Plasma Unit. Note: This connector will not accept any other input than the A/V Unit. Do not plug any connectors from external equipment into this connector.

NOTICE the Power Button on the right hand side of the "FROM AVC" connector. This button is used with no connectors except AC plugged into the Plasma Display Unit. When pressed, the Plasma Display will generate Rasters of different colors for Test purposes. See Trouble Shooting for further details.



SECTION FORE

(4)

SPECIFICATIONS

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PLASMA PICTURES



This picture shows the 32HDT20 with the A/V unit which is included.



This picture shows the 42HDT20 with the A/V unit which is included.

SPECIFICATIONS ARE SUBJECT TO CHANGE WITHOUT NOTICE.

32HDT20 (Page 1 of 2)

**Hitachi UltraVision Digital
32" 16:9 Plasma HDTV Monitor**

Video

High Contrast Home Theater Pure Color Glass Shield
852 x 1024 display resolution
Brightness: 650cd/m2 panel brightness
Aspect Ratio: 16:9
HDTV Monitor displays HDTV when combined with HDTV Tuner***
ALiS (alternate lighting of surfaces technology)
Computer Display: VGA, SVGA, XGA, SXGA (scaled)
Viewing Angle: More than 160°
Number of Colors: 16.8 million

Sound

Built-in Stereo Amplifier: 7W + 7W Output
2 pair RCA pin stereo inputs for RGB or Digital inputs

Features

Multiple Picture Formats**
- 4:3 Standard, - Expanded, - Zoom 1, - Zoom 2, - 16:9 Standard

Picture MODES

- Sports, - Movies, - News, - Music

3 Color Temperature presets:

- 6500K, - 7500K, - 9200K

Video Adjustments:

- Contrast, - Brightness, - Color, - Tint, - Sharpness

RGB Adjustments: Contrast, Brightness, Display Size, Vertical/Horizontal positions, Clock frequency/
phase

Audio Adjustments: Volume, Balance, High, Low, Mute

Remote Control: Full function IR remote control provided

Power Management: ON/OFF via signal detection

Screen Saver: Orbit, White, Reverse

Digital Interface Control jack

D-sub 9 Pin

SPECIFICATIONS ARE SUBJECT TO CHANGE WITHOUT NOTICE.

32HDT20 (Page 2 of 2)

Hitachi UltraVision Digital

32" 16:9 Plasma HDTV Monitor

Cabinet Specifications

Color: Metallic Silver

Width: 38 3/8", Height: 19 3/4", Depth: 3 9/16", Weight : 58 pounds (with stand)

Inputs/Outputs

Multi-Scanning: 24-109 kHz (h), 50-85 Hz (v)

Pixel Pitch: 0.84 (horizontal) x 0.39 (vertical) mm

1 RGB inputs (BNC, VGA) TTL separate sync, TTL composite sync, sync on green

2 Component Video Input (480i/480p/720p/1080i) 1 Digital connector

S-Video Input: 3

Composite Video Input: On Input 2 connector

Audio Amplifier Output: 7W + 7W

Headphone Output

RS-232C Serial Control Connector: D-Sub 9Pins

Power Requirements: 108-132V, 60Hz

Regulations: UL 1950, CSA 22.2 No. 950

EMI: FCC class B consumer

Supplied Accessories

AC Cable

Digital Cables

Infrared Remote Control

Batteries

Owners Manual

Table Top Stand

Speakers Included

Optional Accessories

Wall Mount

32' Monitor Connection Cable

** Screen mode availability varies by input signal.

*** Plasma HDTV Monitor displays HDTV inputs at 1024 x 1024 resolution.

SPECIFICATIONS ARE SUBJECT TO CHANGE WITHOUT NOTICE.

42HDT20 (Page 1 of 2)
Hitachi UltraVision Digital
42" 16:9 Plasma HDTV Monitor

Video

High Contrast Home Theater Pure Color Glass Shield
1024 x 1024 display resolution
Brightness: 700cd/m2 panel brightness
Aspect Ratio: 16:9
HDTV Monitor displays HDTV when combined with HDTV Tuner***
ALiS (alternate lighting of surfaces technology)
Computer Display: VGA, SVGA, XGA, SXGA (scaled)
Viewing Angle: More than 160°
Number of Colors: 16.8 million

Sound

Built-in Stereo Amplifier: 10W + 10W Output
2 pair RCA pin stereo inputs for RGB or Digital inputs

Features

Multiple Picture Formats**
- 4:3 Standard, - Expanded, - Zoom 1, - Zoom 2, - 16:9 Standard

Picture MODES

- Sports, - Movies, - News, - Music

3 Color Temperature presets:

- 6500K, - 7500K, - 9300K

Video Adjustments:

- Contrast, - Brightness, - Color, - Tint, - Sharpness

RGB Adjustments: Contrast, Brightness, Display Size, Vertical/Horizontal positions, Clock frequency/phase

Audio Adjustments: Volume, Balance, High, Low, Mute

Remote Control: Full function IR remote control provided

Power Management: ON/OFF via signal detection

Screen Saver: Orbit, White, Reverse

Digital Interface Control jack

D-sub 9 Pin

SPECIFICATIONS ARE SUBJECT TO CHANGE WITHOUT NOTICE.

42HDT20 (Page 2 of 2)
Hitachi UltraVision Digital
42" 16:9 Plasma HDTV Monitor

Cabinet Specifications

Color: Black and Metallic Silver

Width: 40 9/16"

Height: 25 1/16"

Depth: 3 9/16"

Weight : 86 pounds (with stand)

Inputs/Outputs

Multi-Scanning: 24-109 kHz (h), 50-85 Hz (v)

Pixel Pitch: 0.90 (horizontal) x 0.51 (vertical) mm

1 RGB inputs (BNC, VGA) TTL separate sync, TTL composite sync, sync on green

2 Component Video Input (480i/480p/720p/1080i) 1 Digital connector

S-Video Input: 3

Composite Video Input: On Input 2 connector

Audio Amplifier Output: 10W + 10W

Headphone Output

RS-232C Serial Control Connector: D-Sub 9Pins

Power Requirements: 108-132V, 60Hz

Regulations: UL 1950, CSA 22.2 No. 950

EMI: FCC class B consumer

Supplied Accessories

AC Cable

Digital Cables

Infrared Remote Control

Batteries

Owners Manual

Table Top Stand

Speakers Included

Optional Accessories

Wall Mount

32' Monitor Connection Cable

**** Screen mode availability varies by input signal.**

***** Plasma HDTV Monitor displays HDTV inputs at 1024 x 1024 resolution.**

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SECTION FIVE

(5)

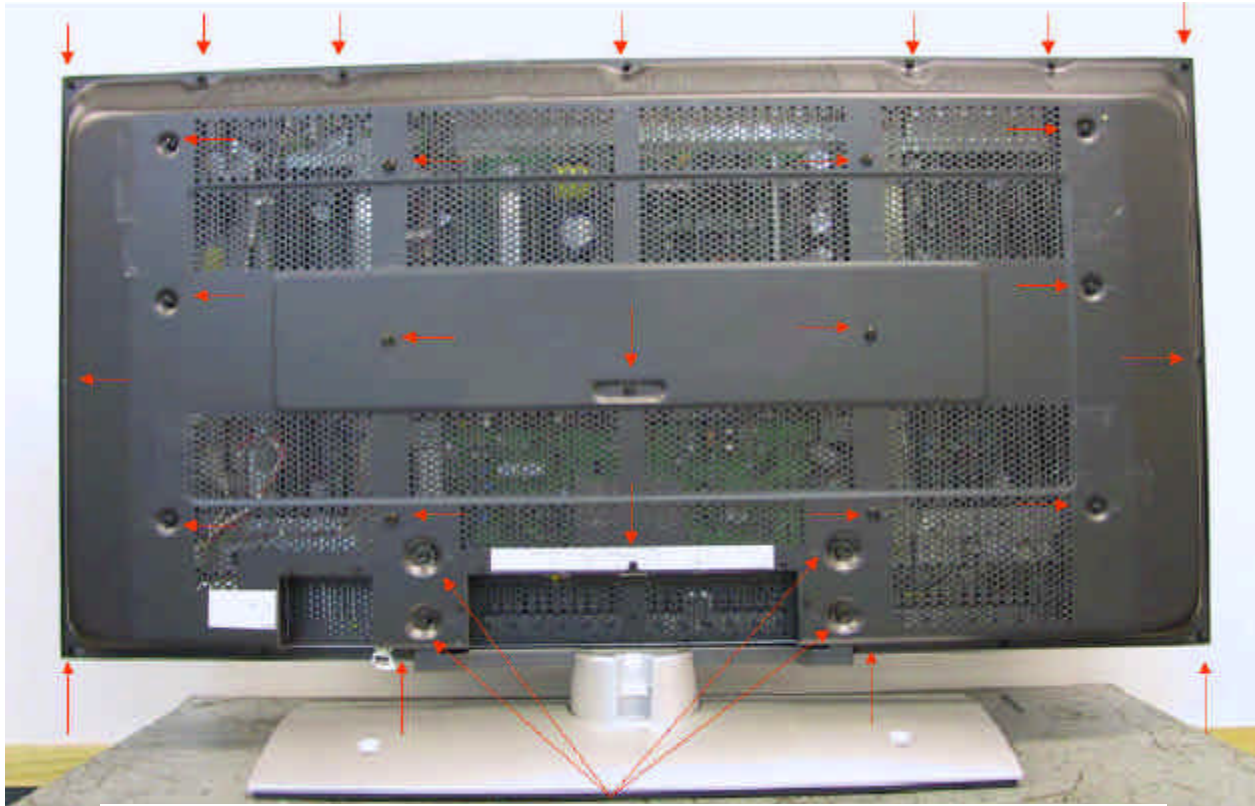
**TEAR
DOWN**

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32HDT20 PLASMA UNIT DISASSEMBLY

Plasma Unit Back View:

Remove the Screws indicated by the arrows to remove the back cover for the Plasma Unit.

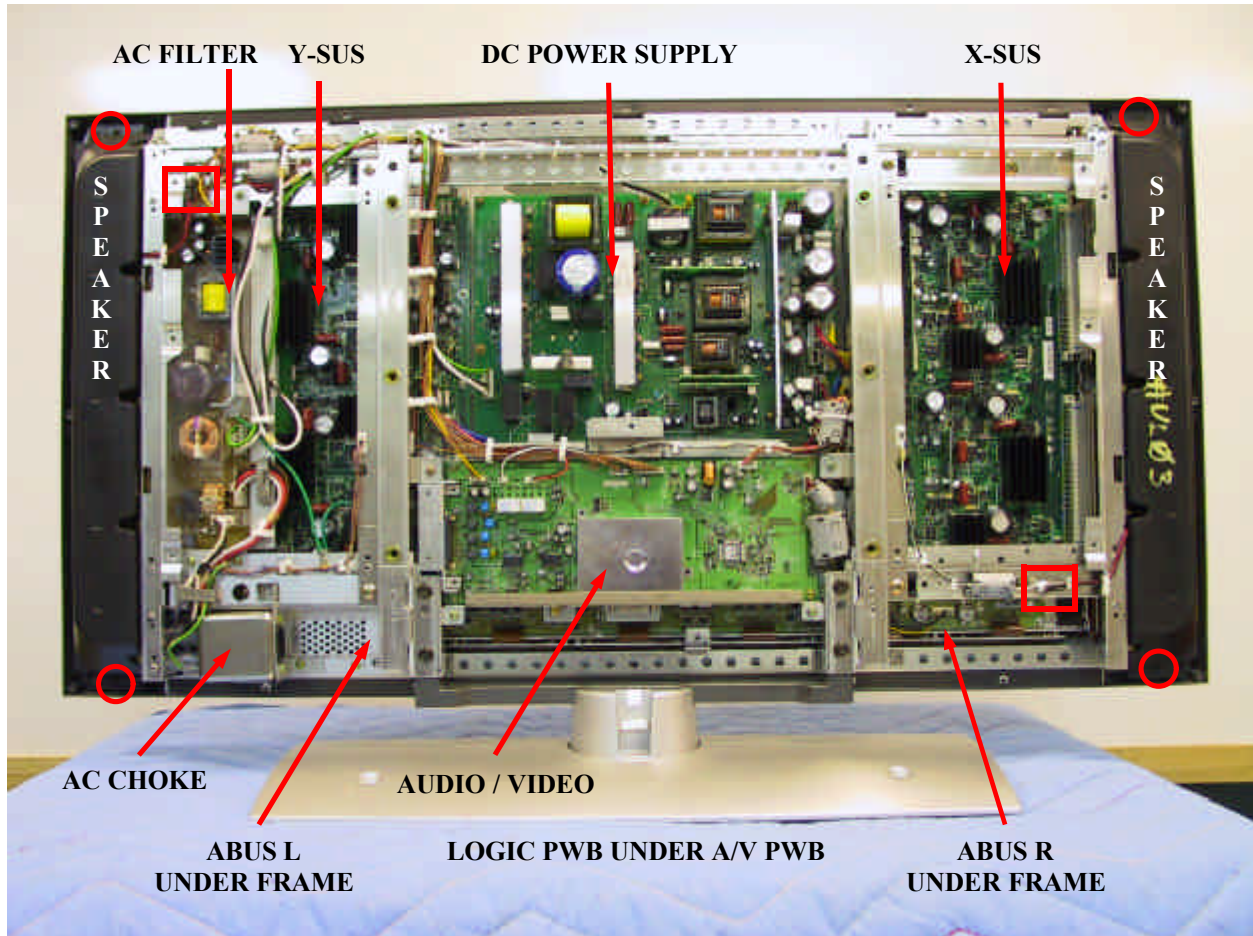


NOTE: The Stand Screws do not have to be removed.

32HDT20 PLASMA UNIT DISASSEMBLY

Plasma Unit Back View with the Back Off:

This picture shows the Plasma Unit with it's back off revealing the PWBs.

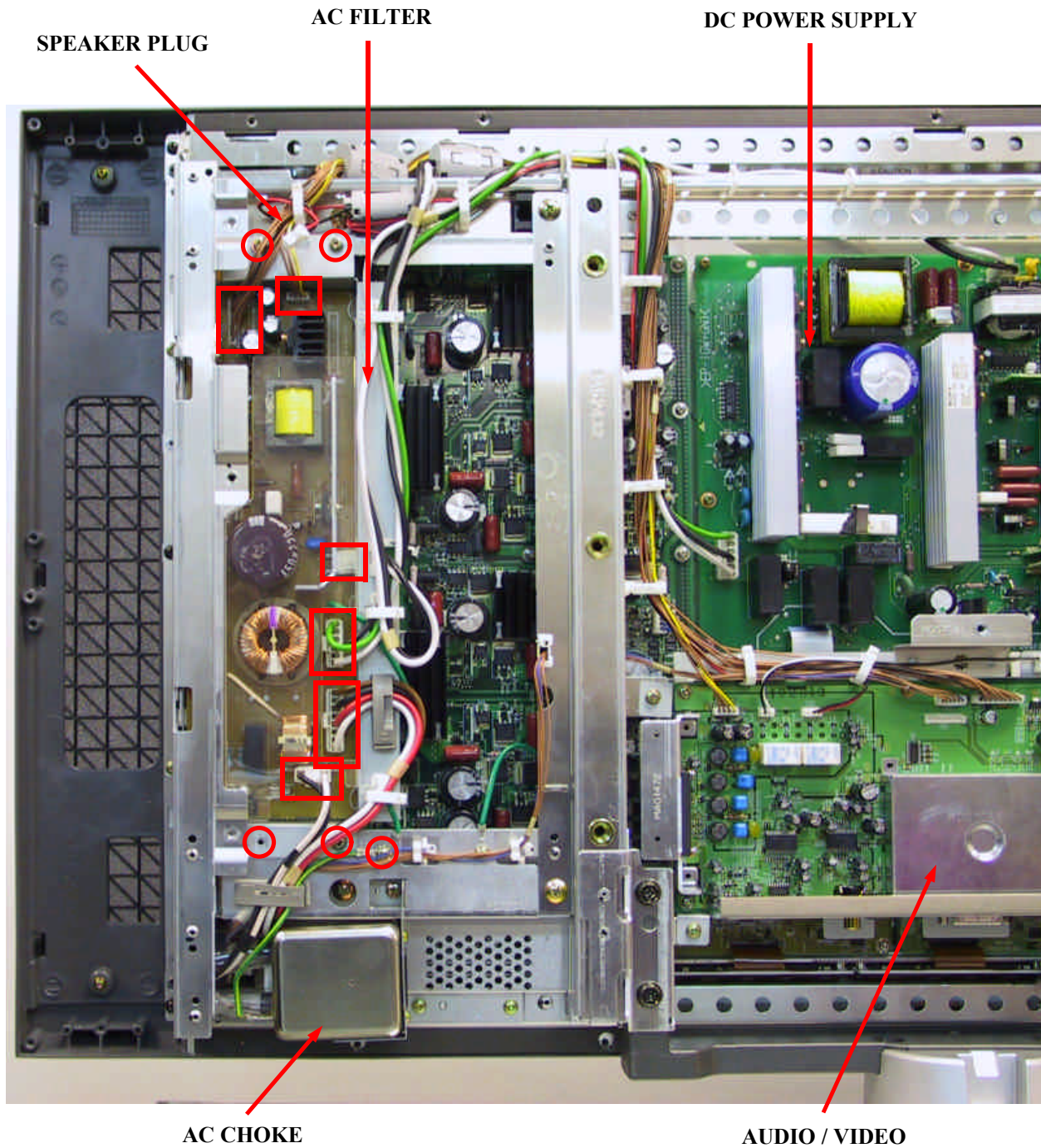


To remove the Speakers,
Remove the 2 screws per/speaker indicated by the circles and
Disconnect the speaker connectors indicated by the rectangles.

32HDT20 PLASMA UNIT DISASSEMBLY

Plasma Unit AC Filter View:

This picture shows a close up view of the AC Filter PWB still in the unit.



To remove the AC Filter PWB,
Remove the 5 screws per/speaker indicated by the circles and
Disconnect the connectors indicated by the rectangles.

32HDT20 PLASMA UNIT DISASSEMBLY

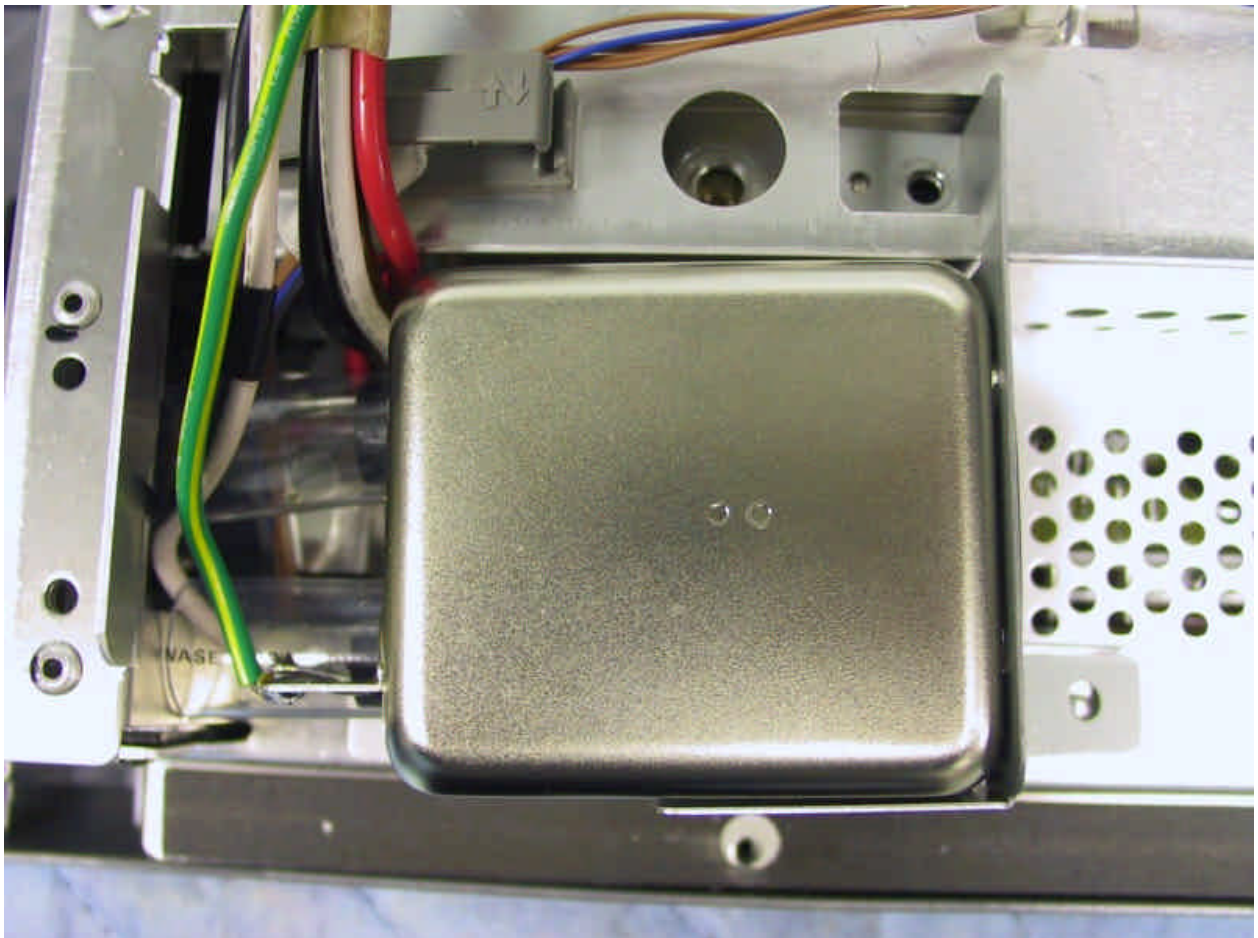
Plasma Unit AC Filter View:

This picture shows a close up view of the AC Filter PWB out of the unit.



Plasma Unit AC Choke View:

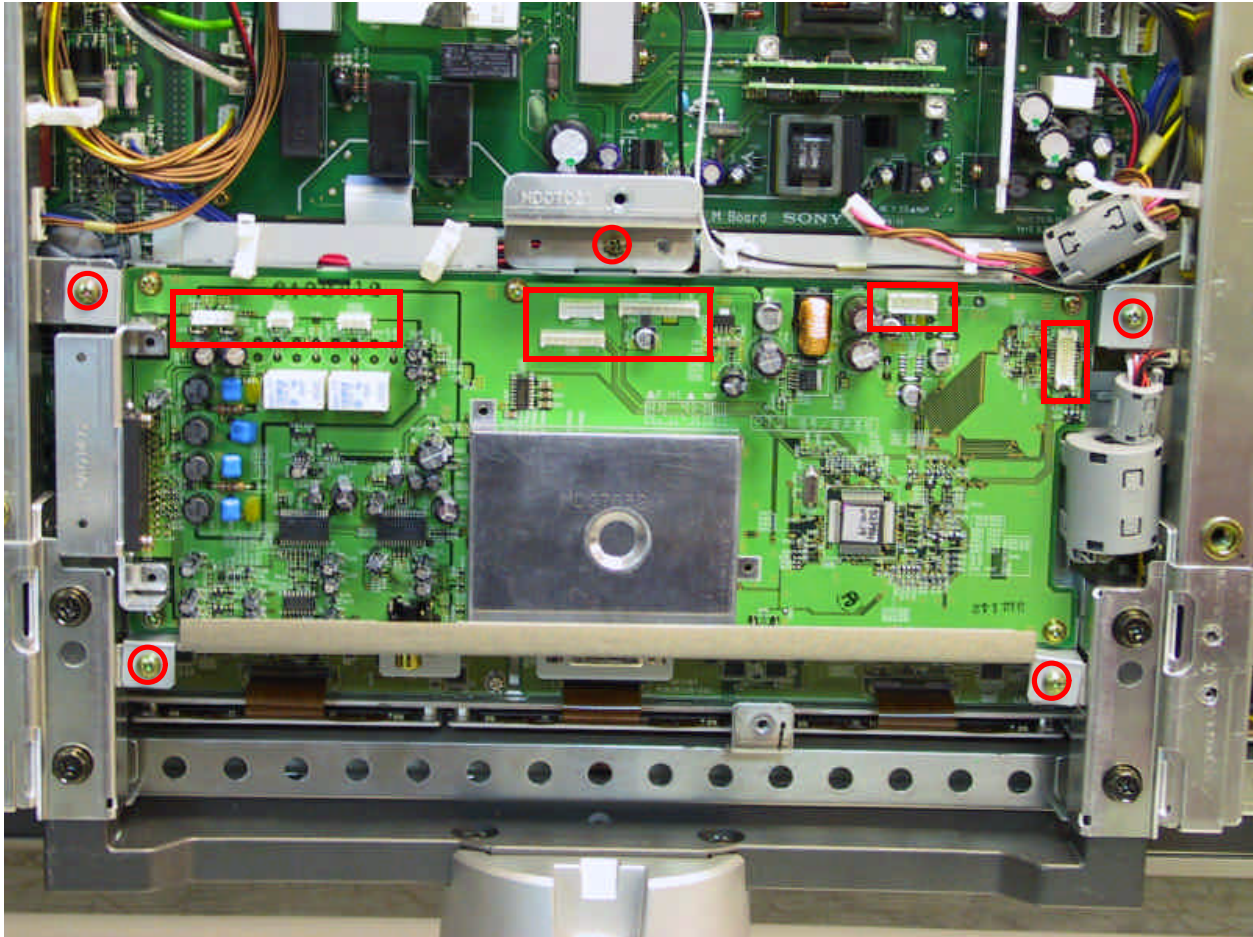
This picture shows a close up view of the AC Choke still in the unit.



32HDT20 PLASMA UNIT DISASSEMBLY

Plasma Unit Audio/Video PWB View:

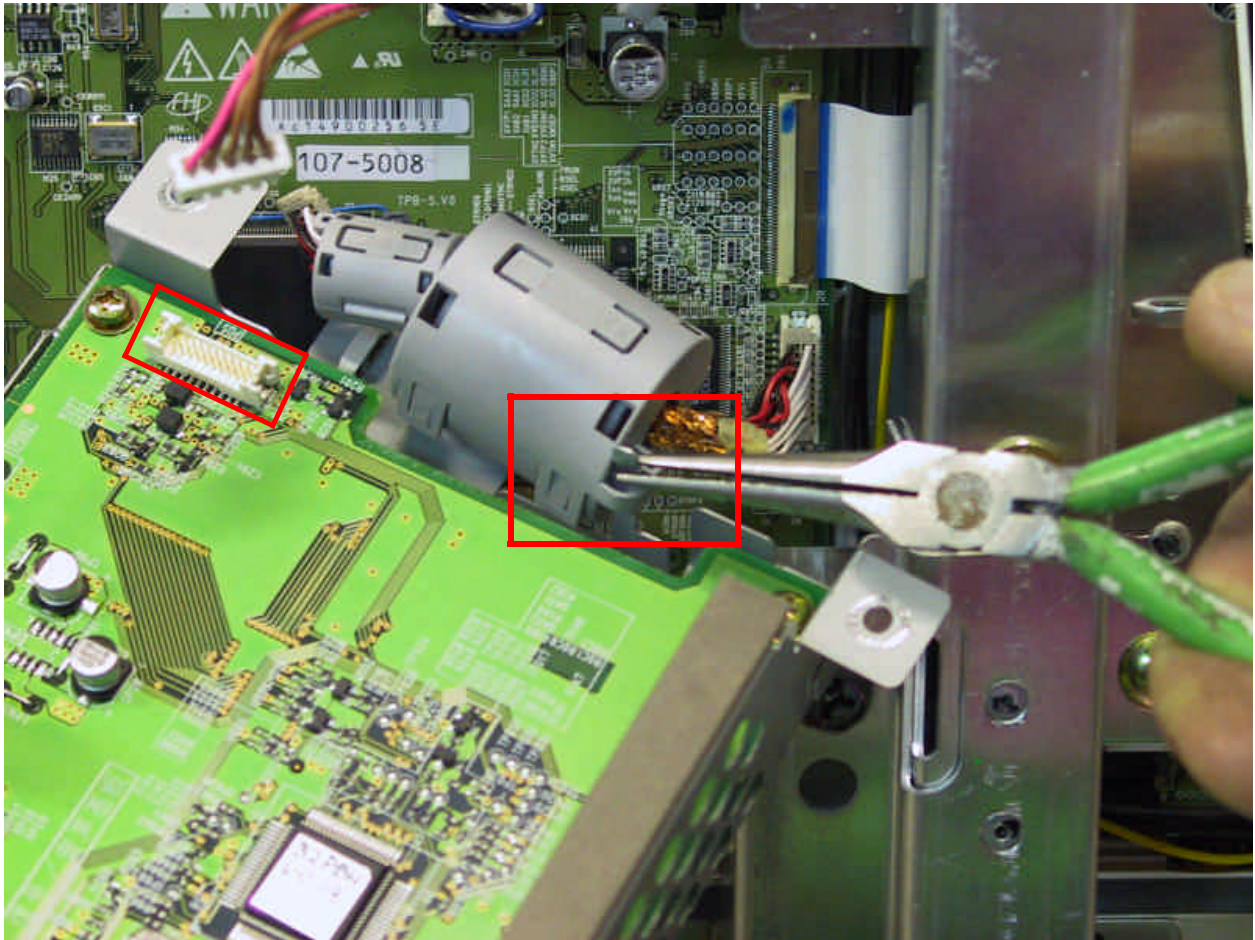
This picture shows a close up view of the Audio / Video PWB still in the unit.



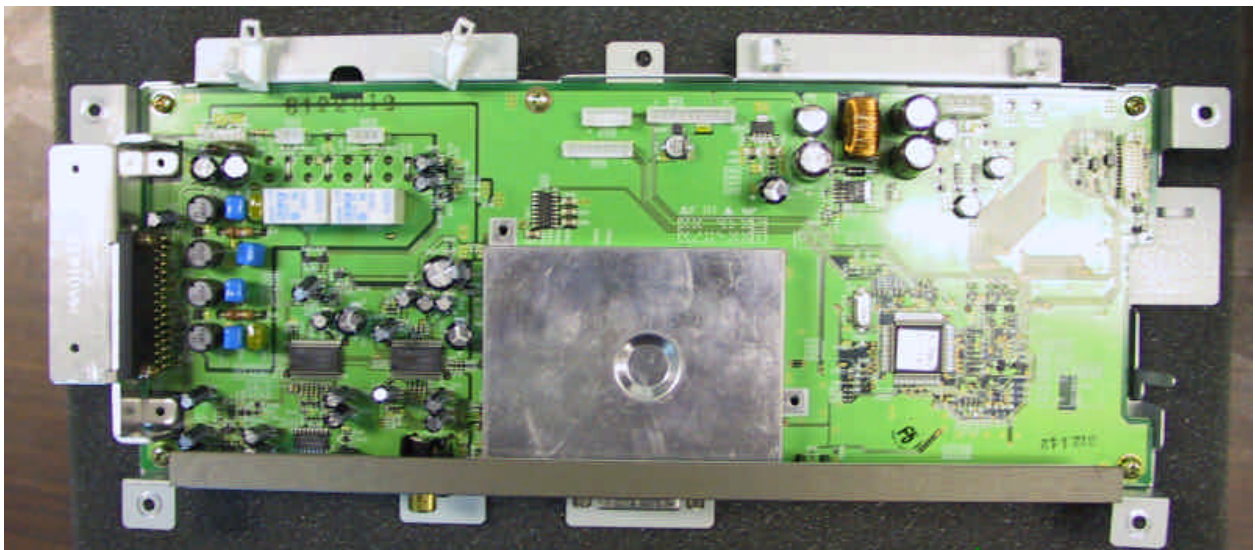
To remove the Audio / Video PWB,
Remove the 5 screws per/speaker indicated by the circles and
Disconnect the connectors indicated by the rectangles.

32HDT20 PLASMA UNIT DISASSEMBLY

Plasma Unit Audio/Video removal View: This picture shows the removal of the Ferrite Choke attached to the Audio / Video PWB.



This picture shows a close up view of the Audio / Video PWB out of the unit.

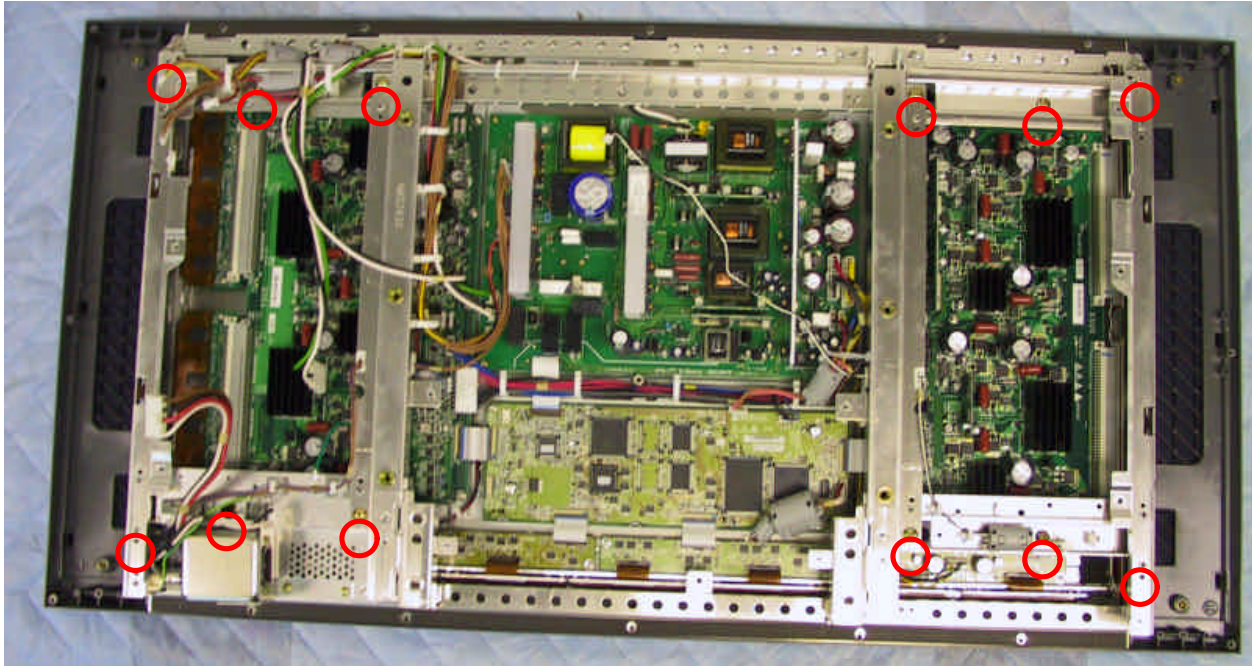


32HDT20 PLASMA UNIT DISASSEMBLY

Plasma Unit Back View: This picture shows the Plasma Unit laying down with the Frame still attached and the Audio / Video, AC Filter PWB removed.

Be sure to lay the unit down on something that is soft and will not scratch the front anti-glare protective glass.

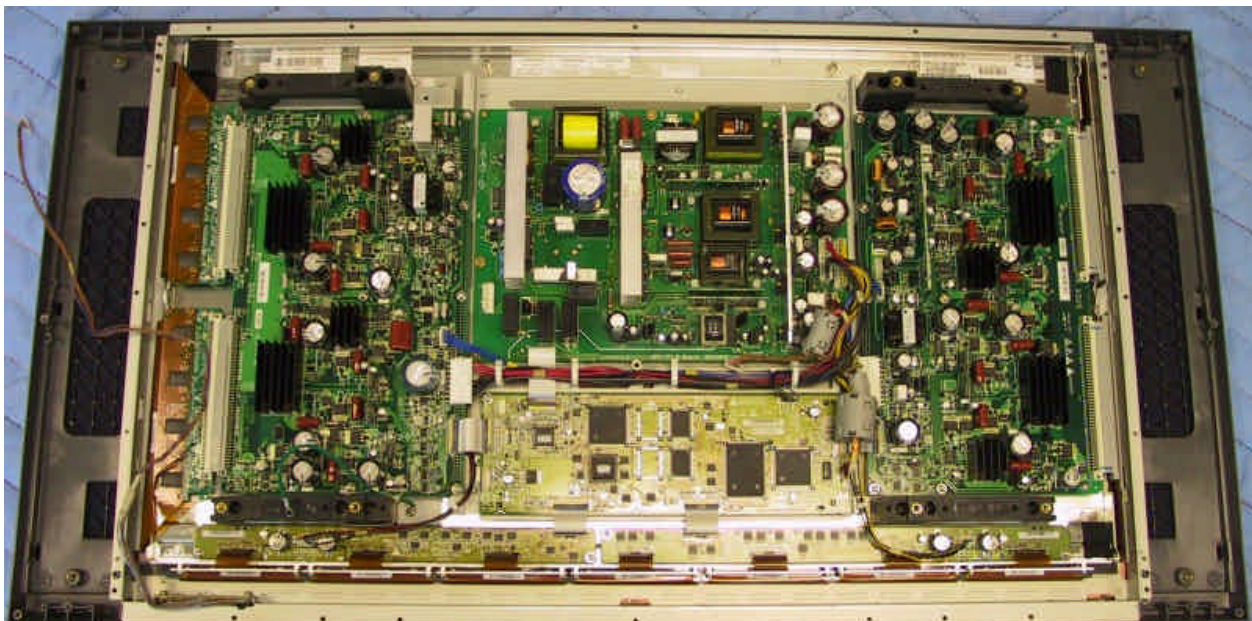
Notice that with the Signal / Audio PWB removed, the LOGIC PWB is now visible.



This picture shows the Plasma Unit laying down with the Frame, AC Choke, Audio / Video, and the AC Filter PWB removed.

Notice that with the the Frame removed, the Y-SUS PWB is now more visible along with the Left and Right ADR PWBs which drive the Vertical Address Buses of the Panel Assembly.

To remove the Frame, remove the 12 screws indicated by the circles in the picture above.



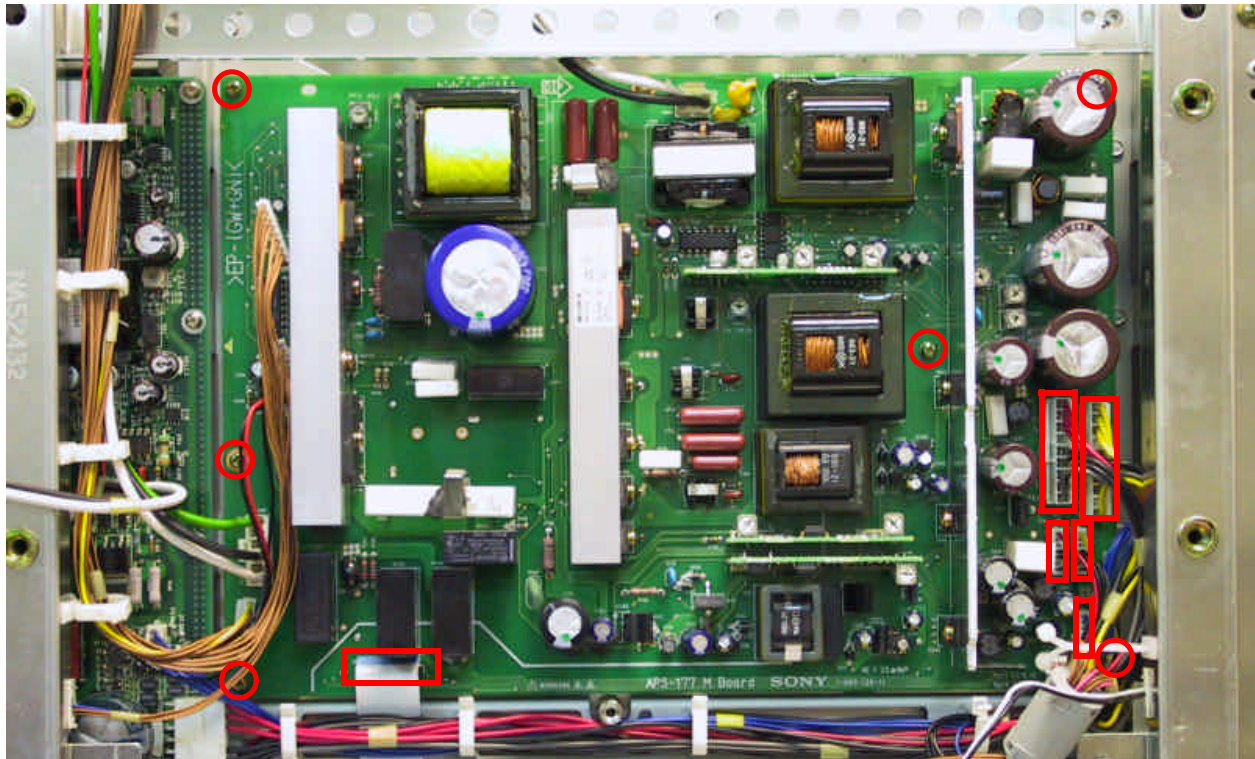
32HDT20 PLASMA UNIT DISASSEMBLY

Plasma Unit DC Power Supply PWB View:

This picture shows the Plasma Unit DC Power Supply.

When this PWB is replaced, two adjustments are necessary.

These adjustments are covered in the Alignment Section.



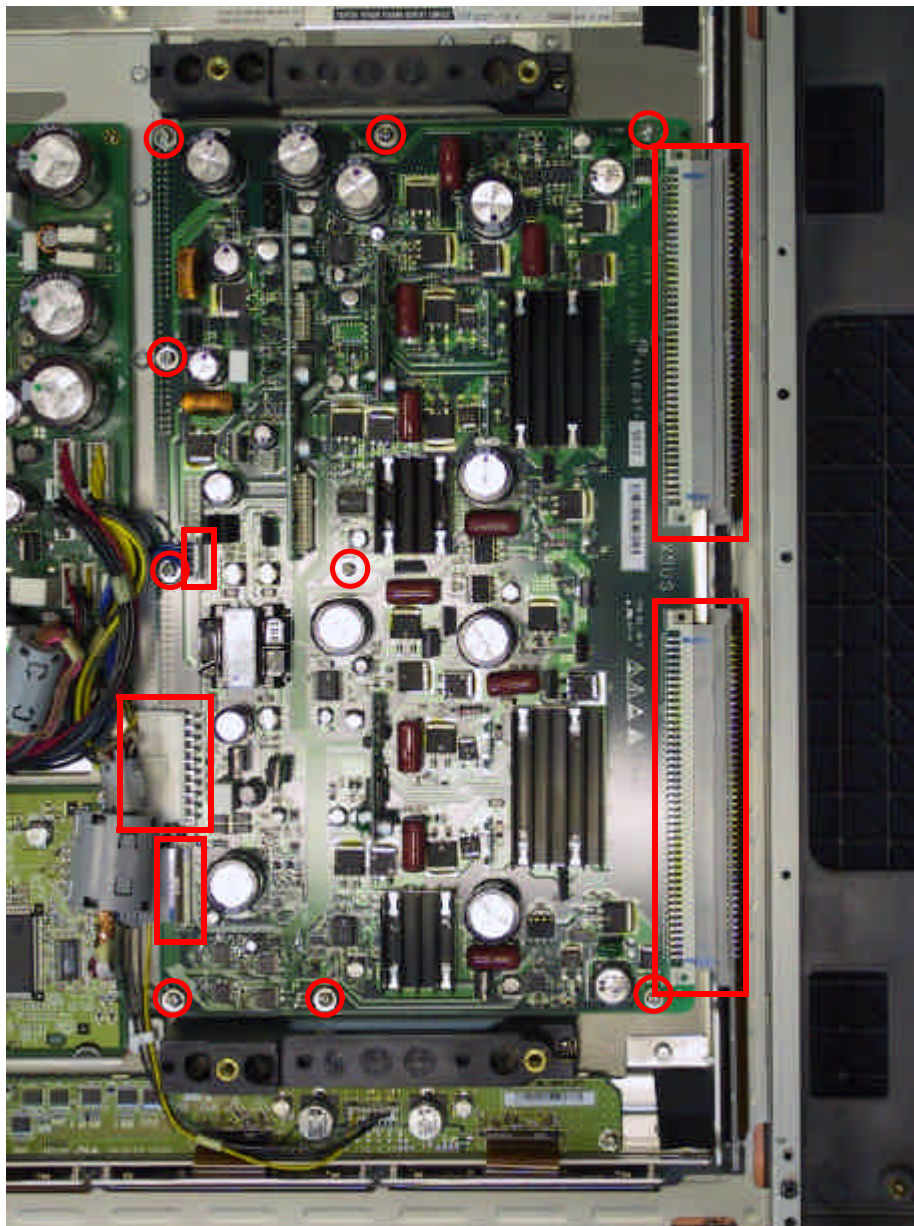
To remove the Power Supply PWB,
Remove the 6 screws indicated by the circles and
Disconnect the connectors indicated by the rectangles.

32HDT20 PLASMA UNIT DISASSEMBLY

Plasma Unit X-YUS PWB View: This picture shows the Plasma Unit X-YUS PWB. To remove this PWB, remove the screws attaching the PWB to the Frame, disconnect the wired connectors on the left hand side of the PWB and slide the PWB to the left to release the connectors on the right that go to the Panel Glass.

WARNING: Be careful with the connectors on the right as they can split. If these connectors are damaged, the entire Plasma Glass must be replaced as they are not replaceable.

To remove the X-SUS PWB,
Remove the 9 screws indicated by the circles and
Disconnect the connectors indicated by the rectangles.

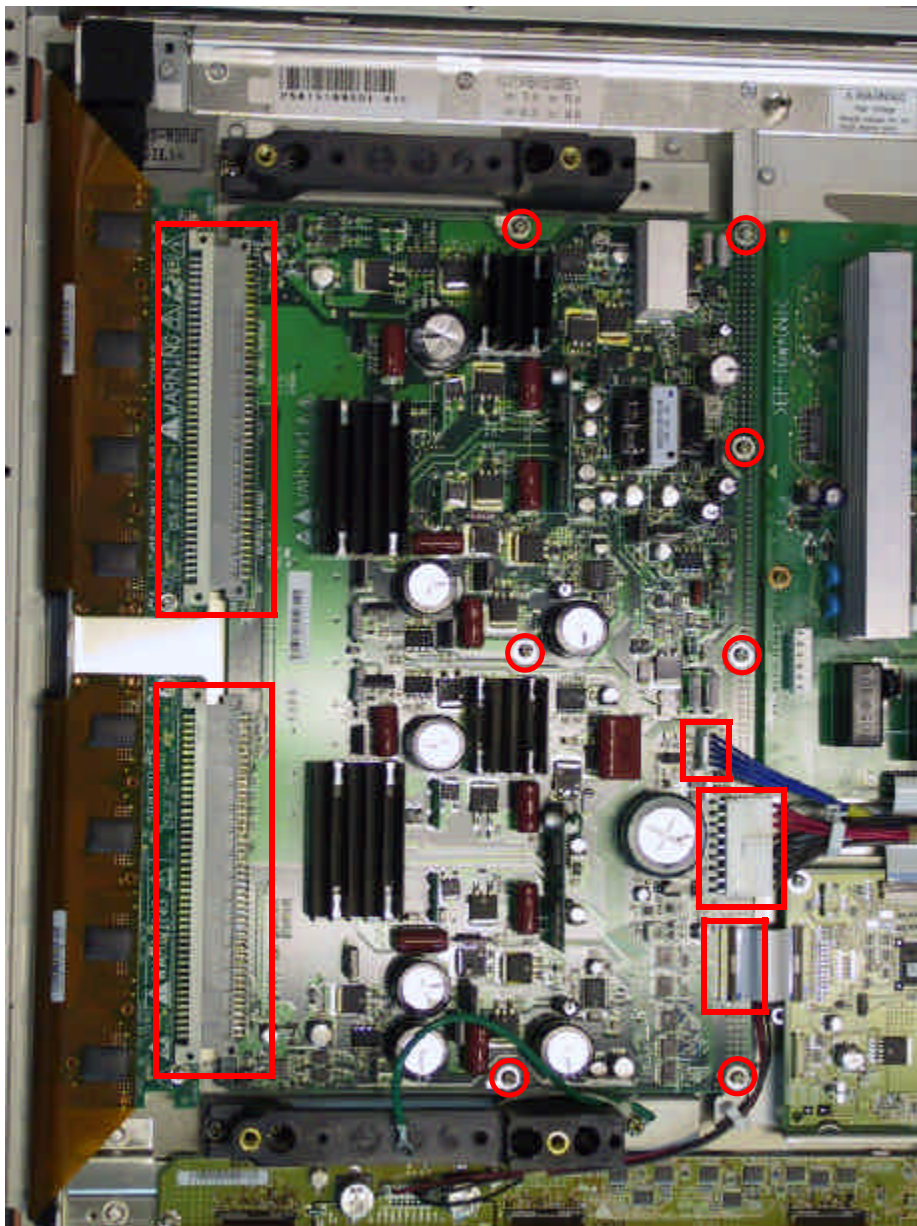


32HDT20 PLASMA UNIT DISASSEMBLY

Plasma Unit Y-SUS PWB View: This picture shows the Plasma Unit Y-YUS PWB. To remove this PWB, remove the screws attaching the PWB to the Frame, disconnect the wired connectors on the right hand side of the PWB and slide the PWB to the right to release the connectors on the left that go to the Panel Glass.

WARNING: Be careful with the connectors on the left as they can split. If these connectors are damaged, the entire Plasma Glass must be replaced as they are not replaceable.

To remove the Y-SUS PWB,
Remove the 7 screws indicated by the circles and
Disconnect the connectors indicated by the rectangles.

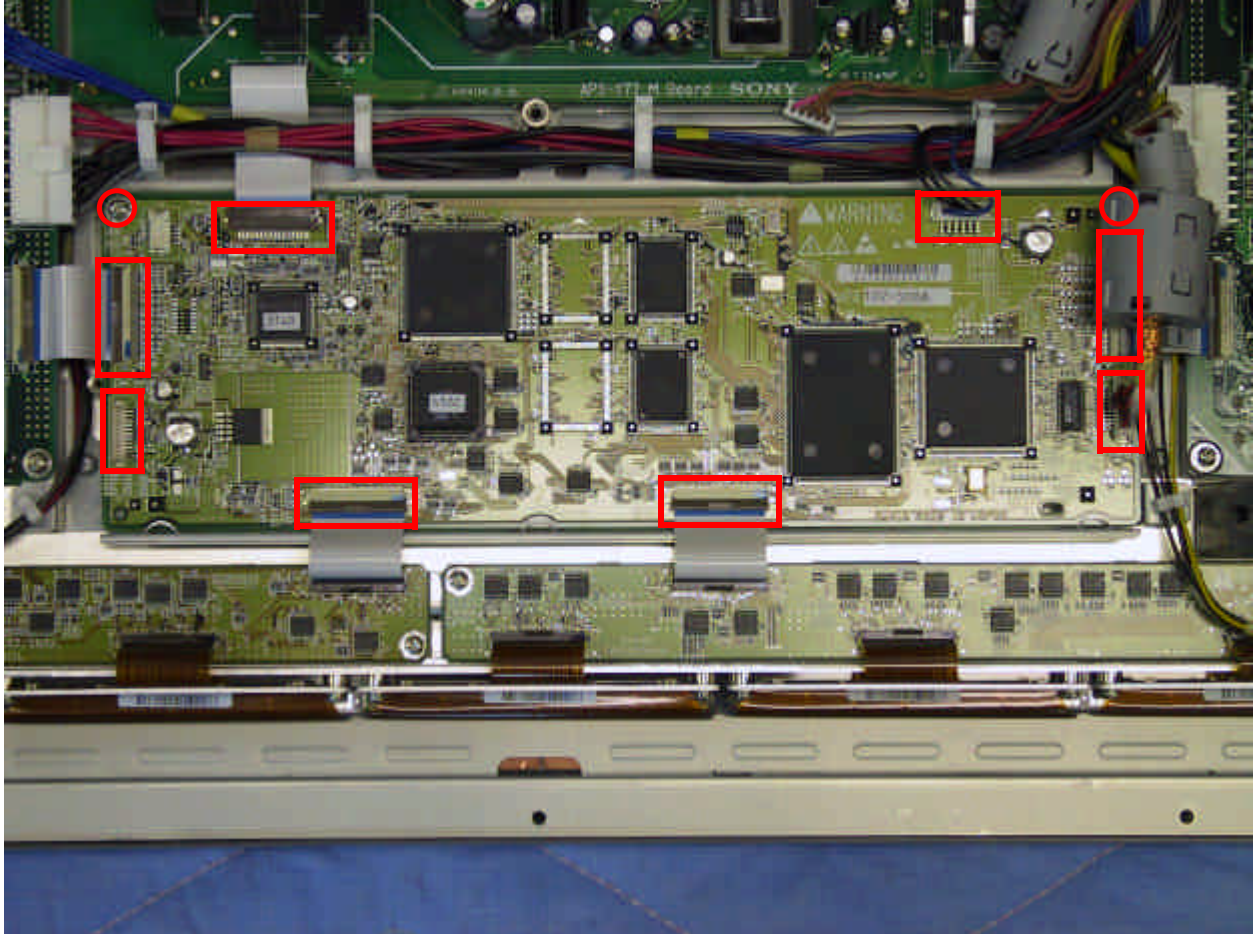


32HDT20 PLASMA UNIT DISASSEMBLY

32HDT20 Plasma Unit Logic PWB View:

This shows the Plasma Unit Logic PWB. This PWB is much easier to access without the Frame. To remove, the PWB screws are removed, the connectors are disconnected and the PWB is lifted out.

Just below this PWB is the ABUS R and ABUS L PWBs.



To remove the Logic PWB,
Remove the 2 screws indicated by the circles and
Disconnect the connectors indicated by the rectangles.

42HDT20 DISASSEMBLY PROCEDURE

REAR VIEW

Rear View:

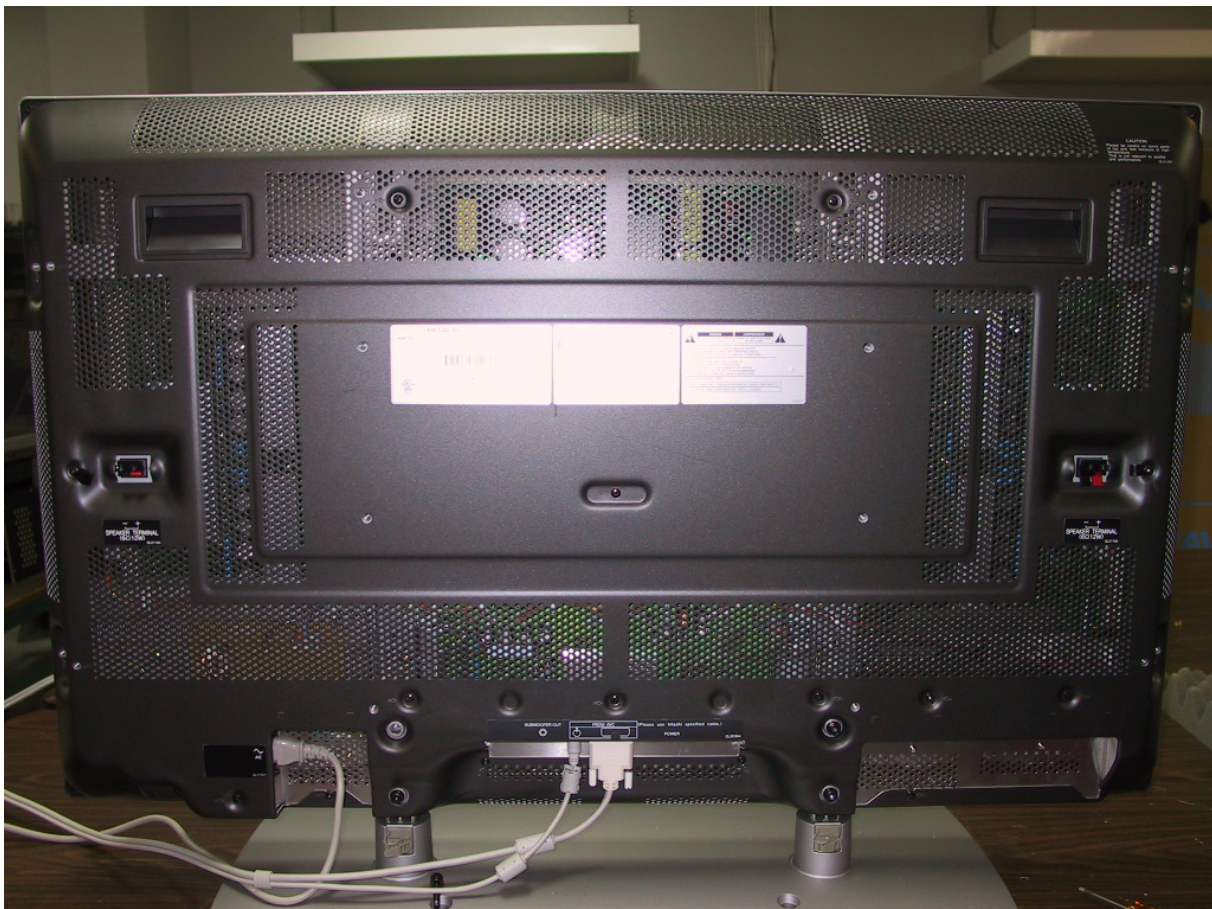
Remove/Disconnect speakers, if present. (Not shown here, they are shown Later).

Unplug the three connectors, (AC and DVI Interface connector cable from AVC Unit, 2 connectors in one cable.)

Remove screws from rear panel (20 screws) shown on next page.

The Stand does not need to be removed to remove the back.

Notice on the 42HDT20 that the Speakers are on the "outside" of the cabinet.



42HDT20 DISASSEMBLY PROCEDURE

REAR SCREWS TO REMOVE

Plasma Unit Back View: Remove the Screws indicated to remove the back cover for the Plasma Unit. Stand does not need to be removed.

Notice on the 42HDT20 that the Speakers are on the "outside" of the cabinet.

Next page shows a Close-up of the Speaker.



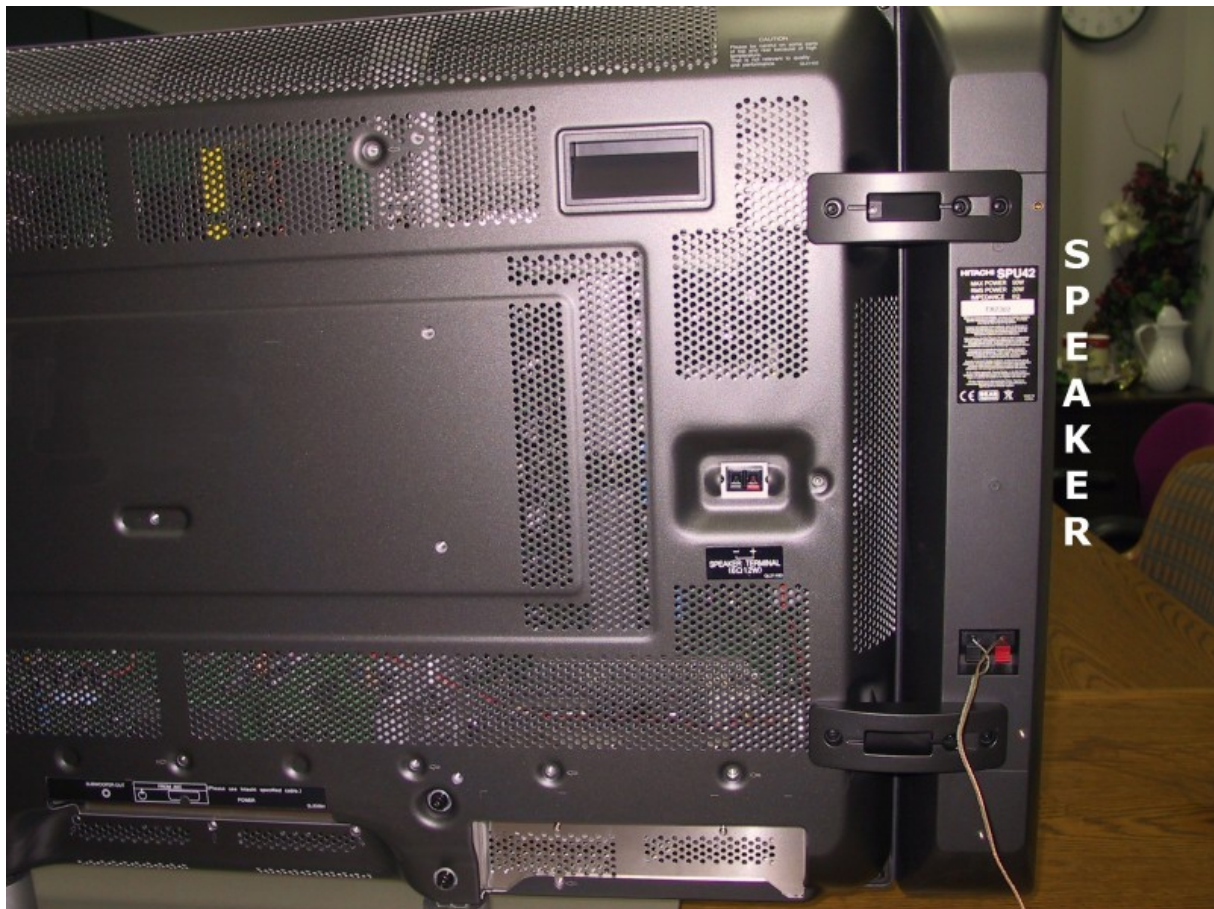
42HDT20 DISASSEMBLY PROCEDURE

RIGHT HAND SPEAKER CLOSE UP

This picture shows a close up of the Plasma Left Speaker as viewed from the rear. Two screws are holding the bracket to the Plasma Unit.

One is shown and one is not seen here. (The two screws into the speaker do not need to be removed).

Disconnect Speaker wire, remove two screws connecting the bracket to the plasma unit, lay speaker aside, being careful not to scratch or tear the speaker grill cloth.



42HDT20 DISASSEMBLY PROCEDURE

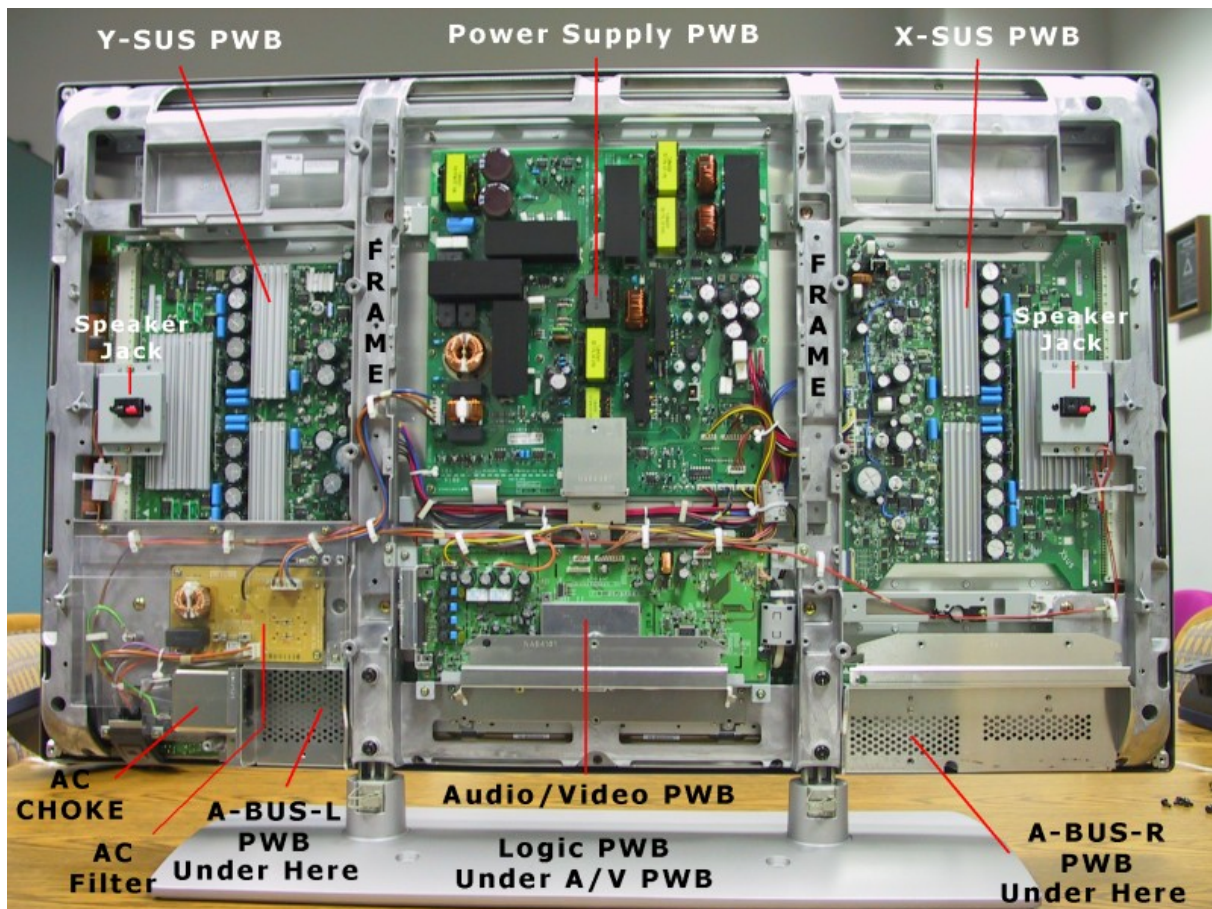
PWB IDENTIFICATION

Plasma Unit Back View: This Picture shows the 42HDT20 with it's back removed. The individual PWBs are named.

Use this to become acquainted with the PWB names and their location.

The Audio/Video PWB (center bottom) is the "Interface PWB" from the A/V Unit.

Note that in this model, unlike the 32HDT20, the location and size of the "AC Filter PWB" (bottom left) is totally different. The AC choke remains the same.

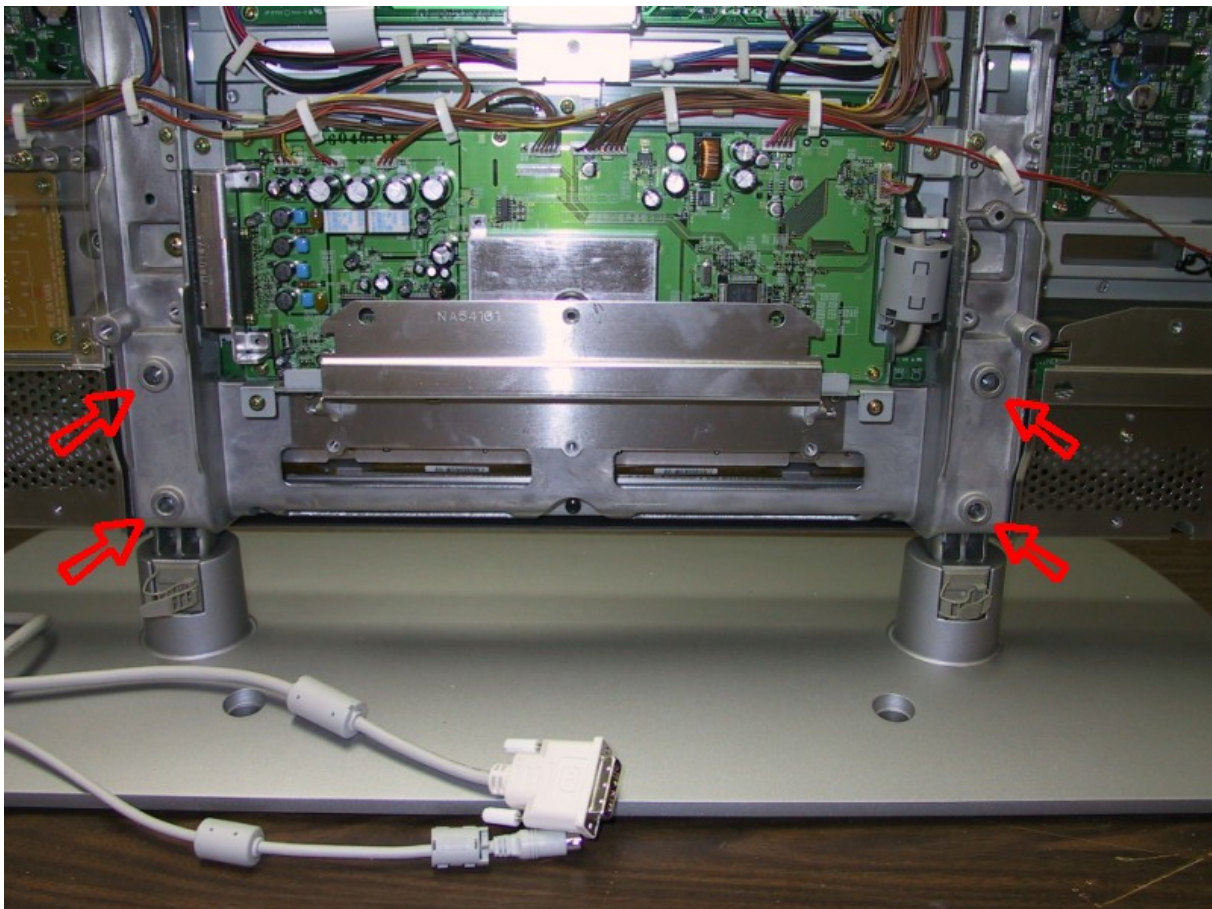


42HDT20 DISASSEMBLY PROCEDURE

STAND SCREWS FOR STAND REMOVAL

This Picture shows the location for the screws that hold the Stand for the 42HDT20 with it's back removed.

The Stand must be removed to allow removal of the panel frame assembly.



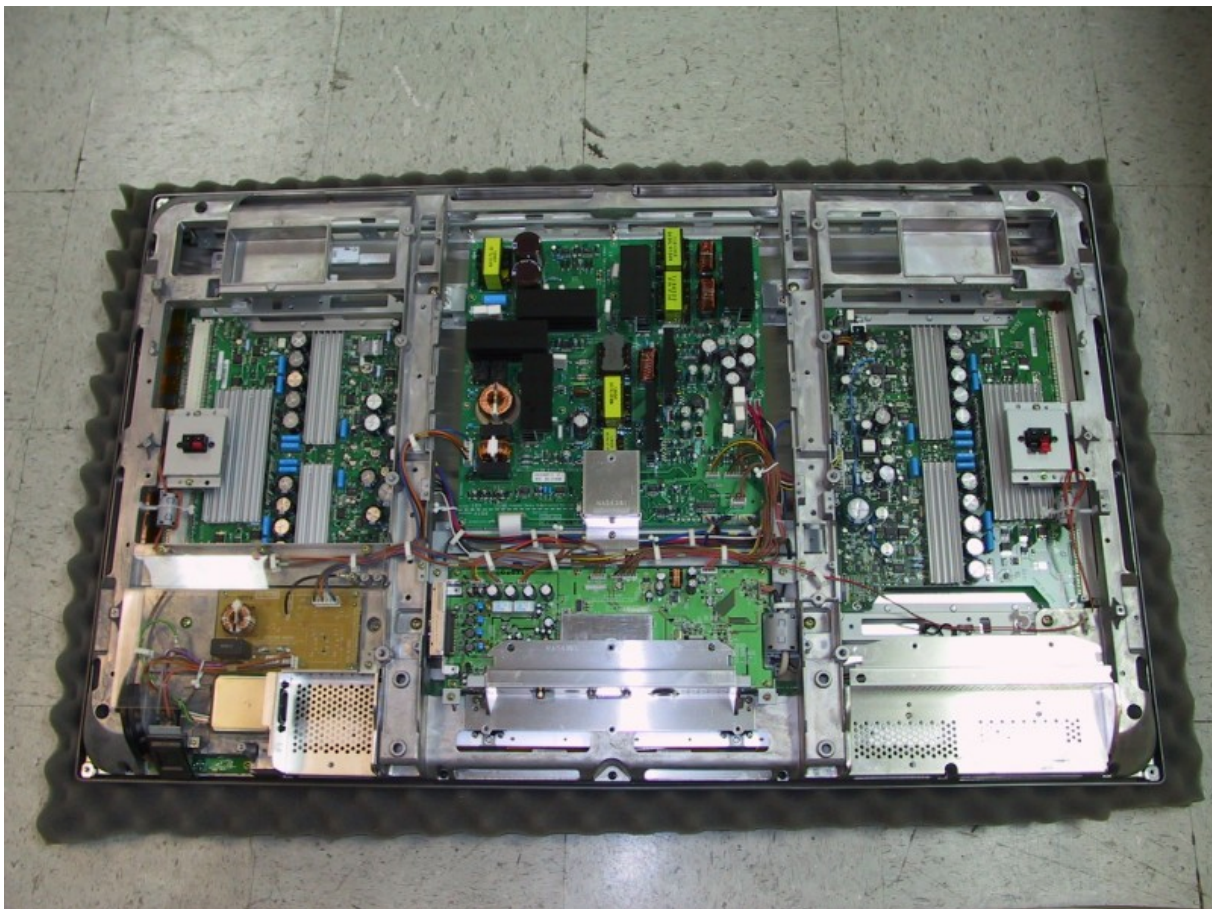
42HDT20 DISASSEMBLY PROCEDURE

REAR VIEW

This Picture shows the 42HDT20 Panel assembly laying down on a soft, non-abrasive cushion.

Note: the Frame is still attached making access to the individual PWBs difficult.

The following pages will show the removal procedure for the panel Frame.



42HDT20 DISASSEMBLY PROCEDURE

PANEL LAYING DOWN FOR SERVICE (OUTSIDE SCREWS)

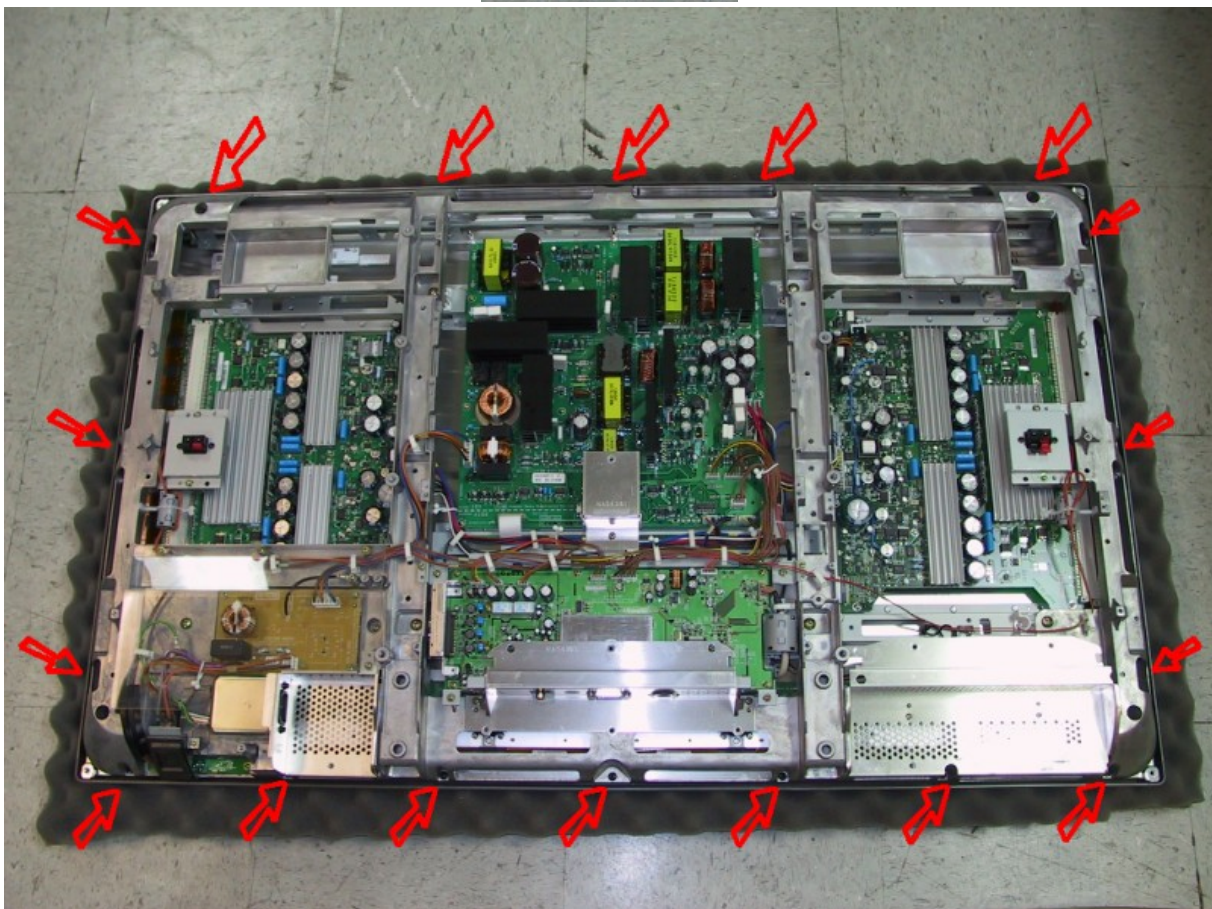
This Picture shows the location for the screws to remove the Frame in the 42HDT20.

Remove 18 black screws shown by the arrows.

Note: Type of Screw used is shown below.

All screws are shown in a close up view later.

Screw removal is also broken down in close up views later.



42HDT20 DISASSEMBLY PROCEDURE

PANEL LAYING DOWN FOR SERVICE (INTER SCREWS)

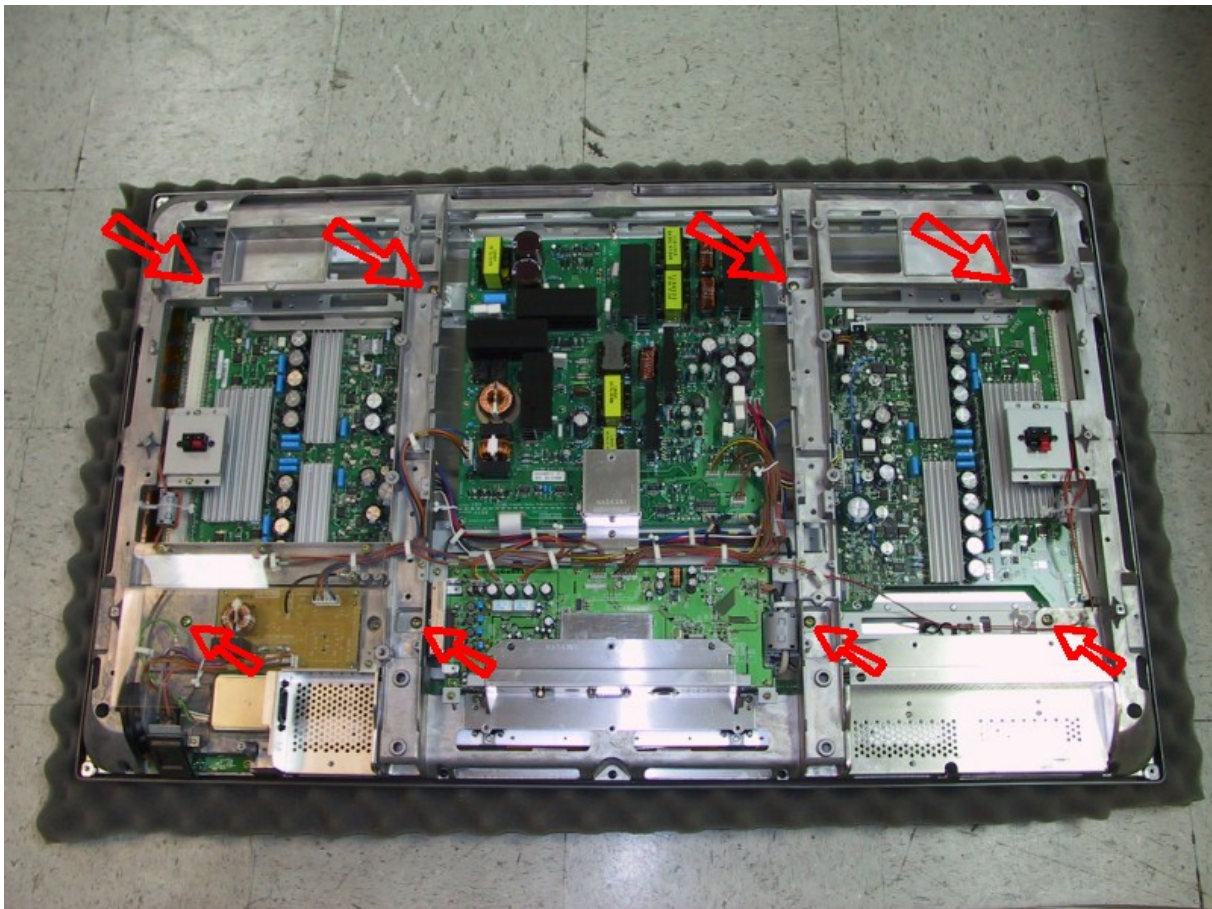
This Picture shows the location for the screws for a continuation to remove the Frame in the 42HDT20.

Remove 8 black screws shown by the arrows.

Note: Type of Screw used is shown below.

All screws are shown in a close up view later.

Screw removal is also broken down in close up views later.



42HDT20 DISASSEMBLY PROCEDURE

PANEL LAYING DOWN FOR SERVICE (LOCK WASHER SCREWS)

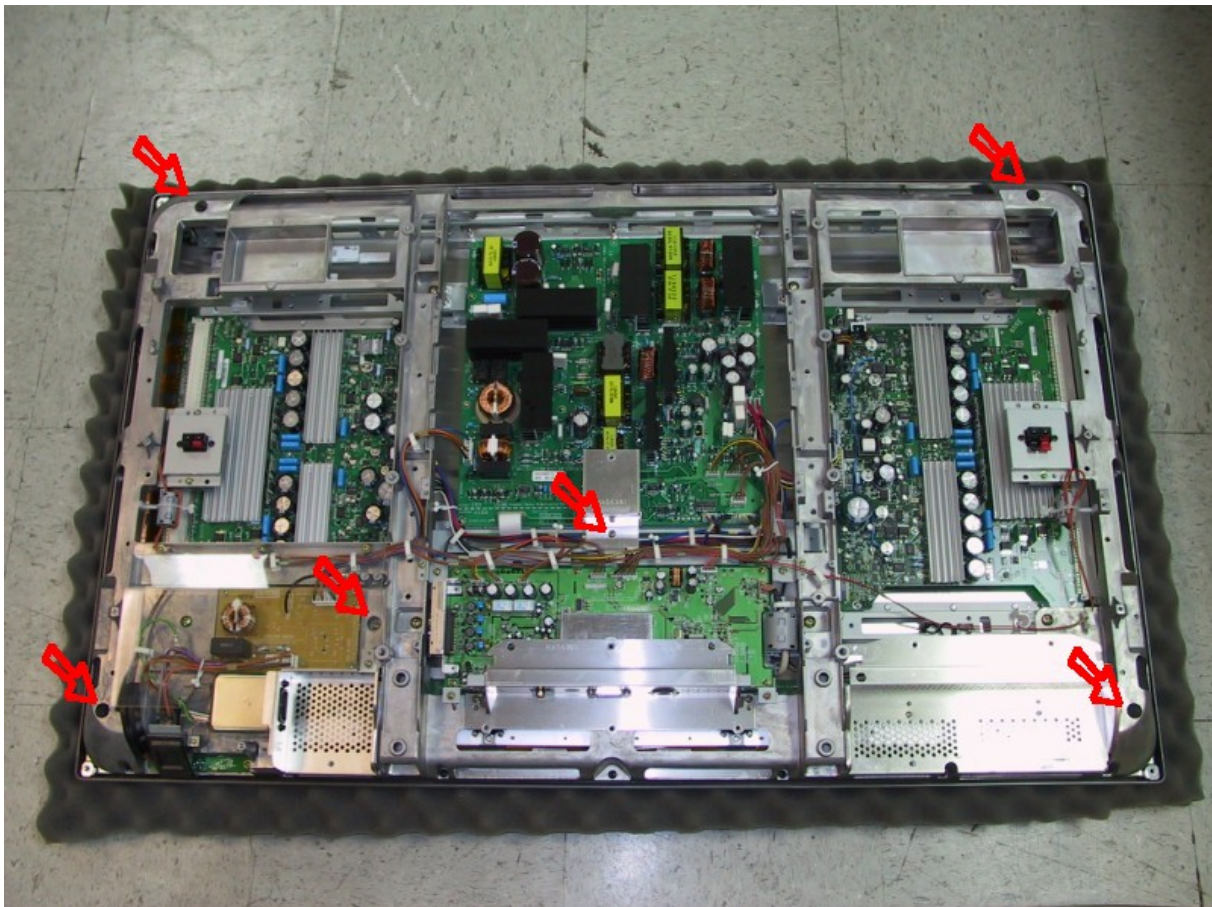
This Picture shows the location for the screws for a continuation to remove the Frame in the 42HDT20.

Remove 6 black screws shown by the arrows.

Note: Type of Screw used is shown below.

All screws are shown in a close up view later.

Screw removal is also broken down in close up views later.



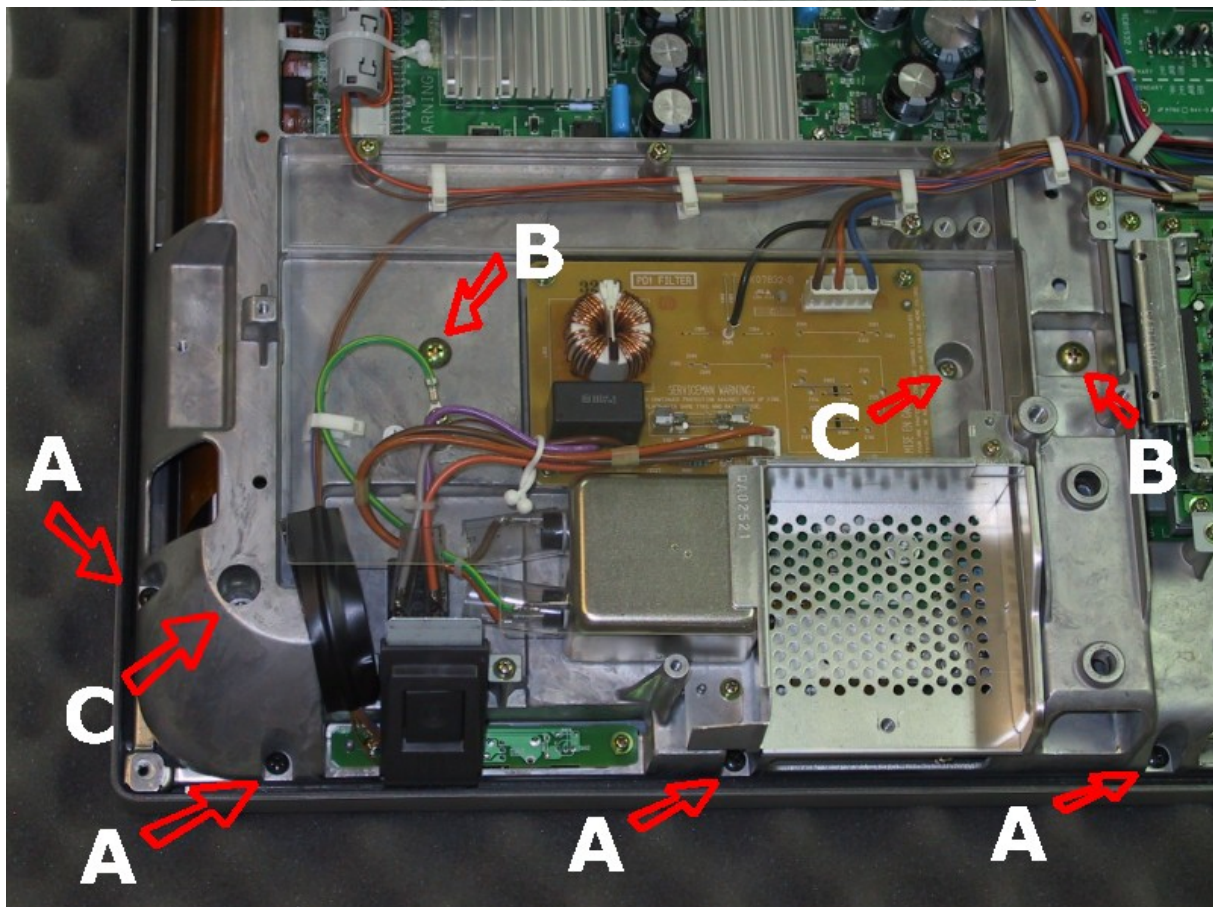
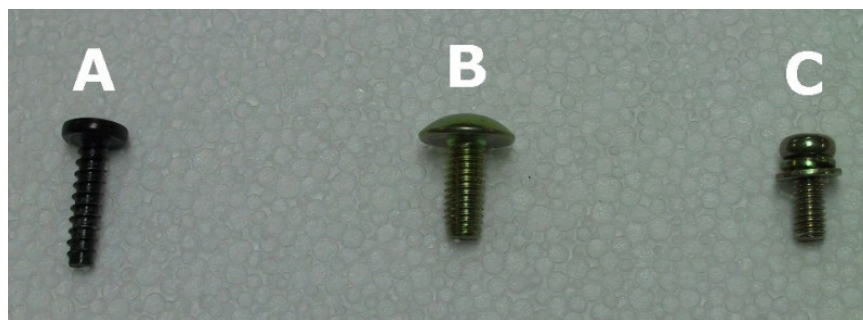
42HDT20 DISASSEMBLY PROCEDURE

CLOSE UP VIEW FOR SCREW REMOVAL (LOWER LEFT)

This Picture shows the location for the screws in the Lower Left hand corner, for a continuation to Disassemble the 42HDT20.

Remove 8 black screws shown by the arrows.

Note: Type of Screw used is shown below.



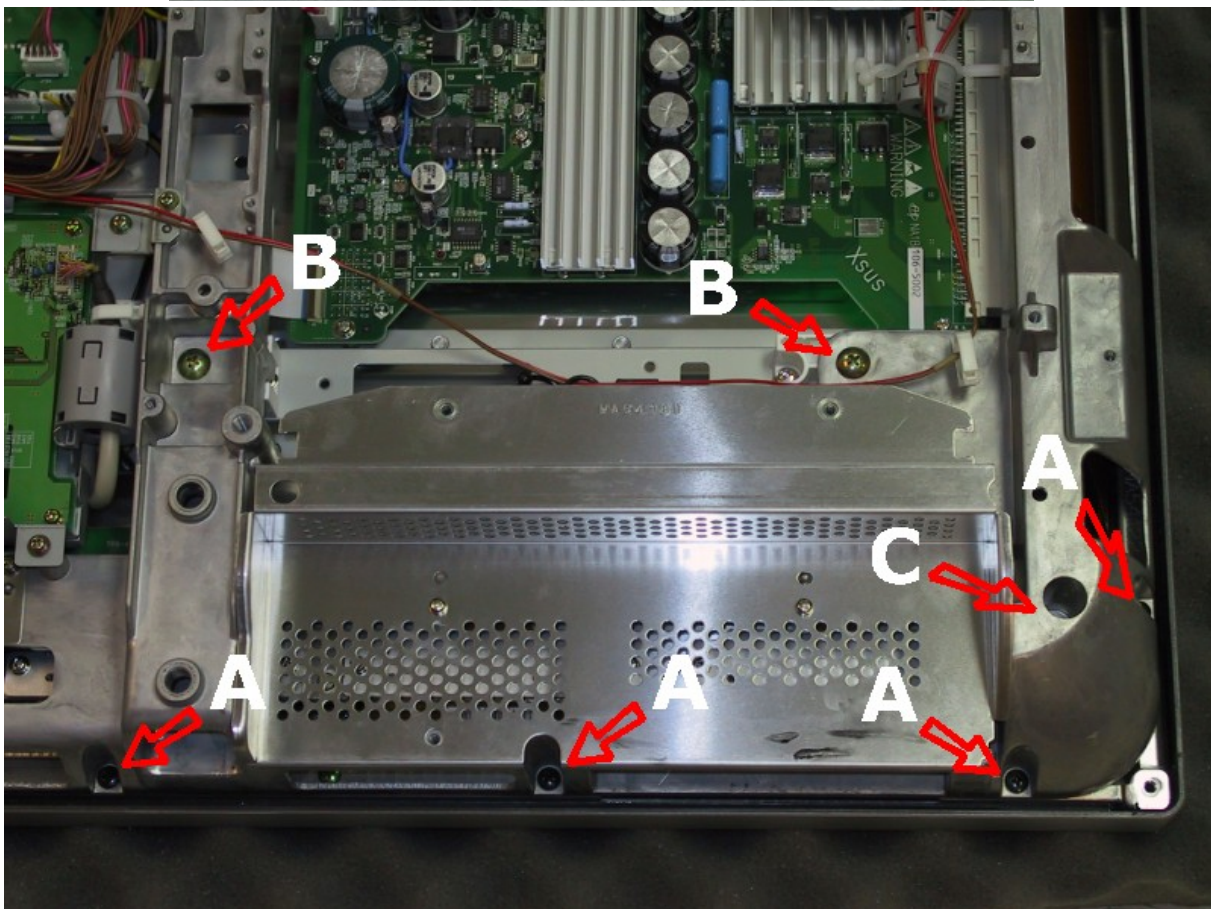
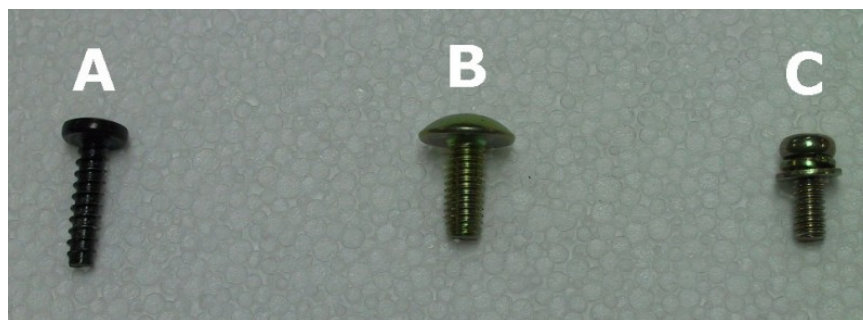
42HDT20 DISASSEMBLY PROCEDURE

CLOSE UP VIEW FOR SCREW REMOVAL (LOWER RIGHT)

This Picture shows the location for the screws in the Lower Right hand corner, for a continuation to Disassemble the 42HDT20.

Remove 7 black screws shown by the arrows.

Note: Type of Screw used is shown below.



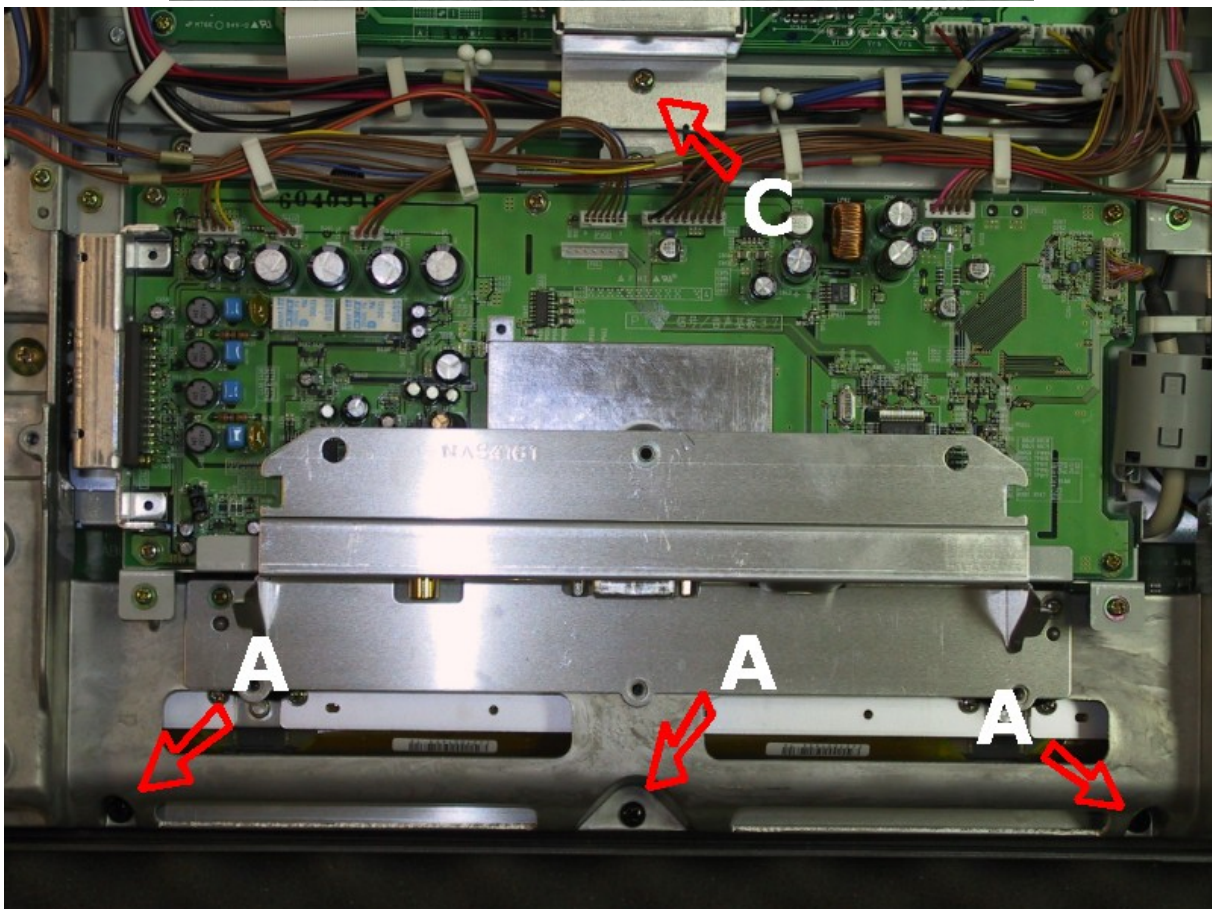
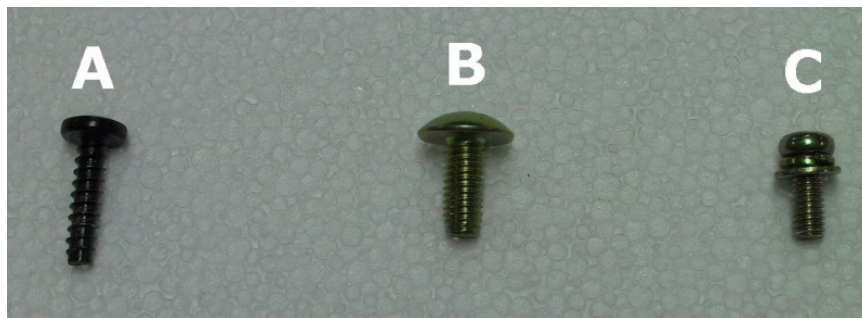
42HDT20 DISASSEMBLY PROCEDURE

CLOSE UP VIEW FOR SCREW REMOVAL (LOWER CENTER)

This Picture shows the location for the screws in the Lower Center, for a continuation to Disassemble the 42HDT20.

Remove 4 black screws shown by the arrows.

Note: Type of Screw used is shown below.



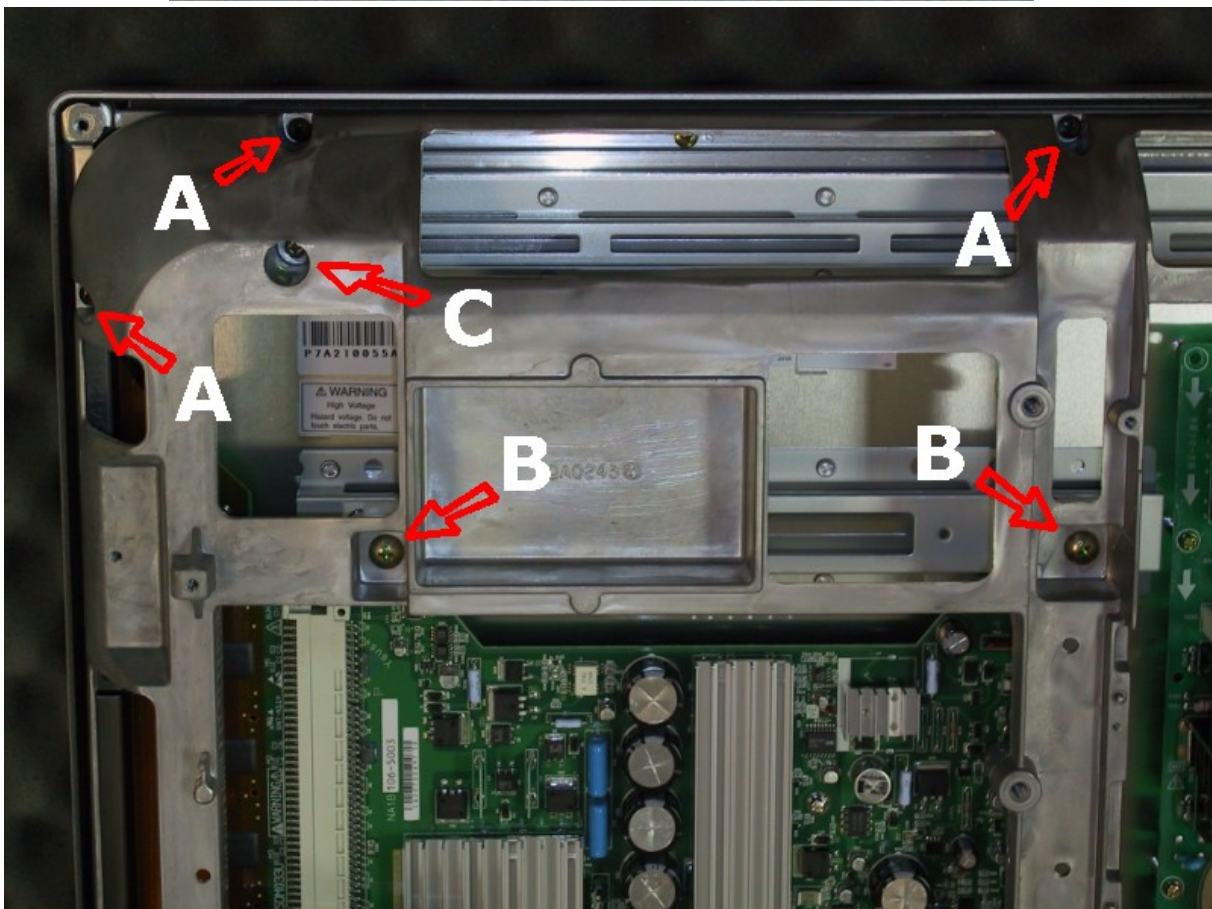
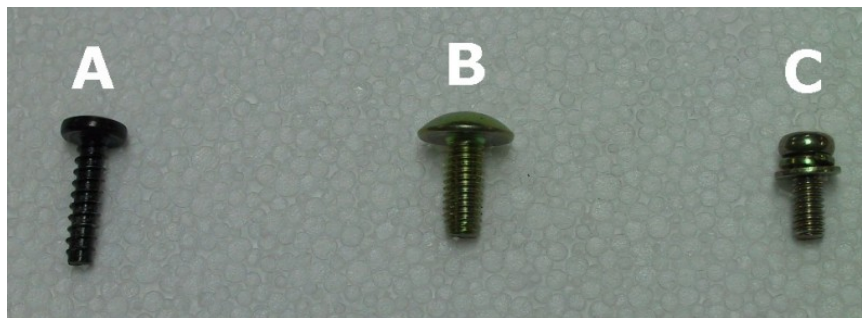
42HDT20 DISASSEMBLY PROCEDURE

CLOSE UP VIEW FOR SCREW REMOVAL (UPPER RIGHT)

This Picture shows the location for the screws in the Upper Left hand corner, for a continuation to Disassemble the 42HDT20.

Remove 6 black screws shown by the arrows.

Note: Type of Screw used is shown below.



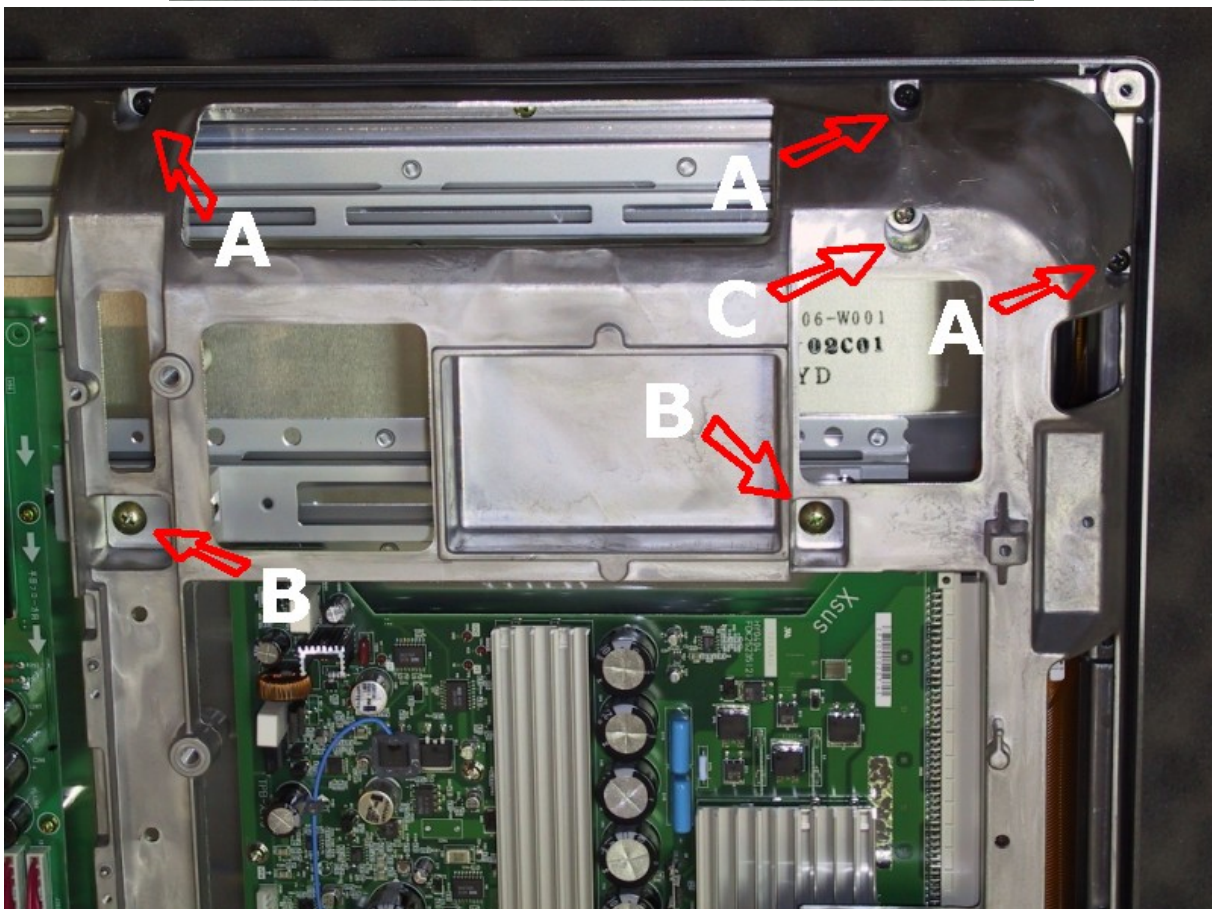
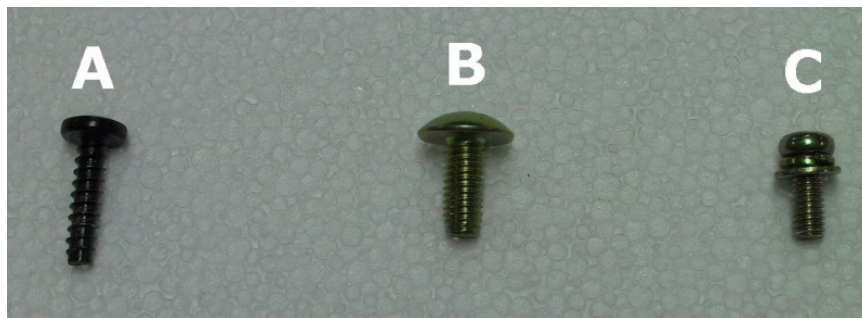
42HDT20 DISASSEMBLY PROCEDURE

CLOSE UP VIEW FOR SCREW REMOVAL (UPPER RIGHT)

This Picture shows the location for the screws in the Upper Right hand corner, for a continuation to Disassemble the 42HDT20.

Remove 6 black screws shown by the arrows.

Note: Type of Screw used is shown below.



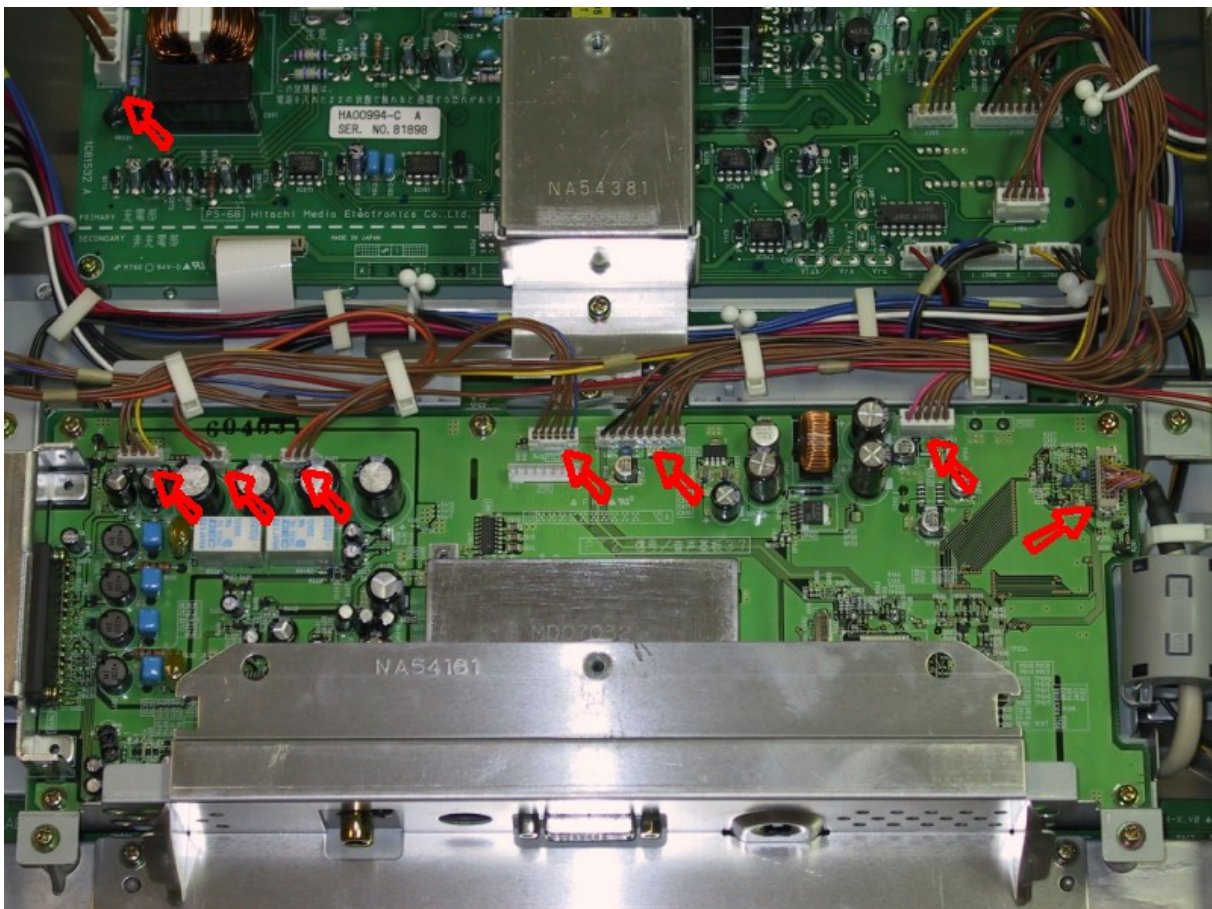
42HDT20 DISASSEMBLY PROCEDURE

CLOSE UP VIEW FOR CONNECTOR REMOVAL (LOWER CENTER)

This Picture shows the location for the Connectors to remove, for a continuation to Disassemble the 42HDT20.

Remove 8 connectors shown by the arrows.

The Frame can now be removed from the Panel assembly.

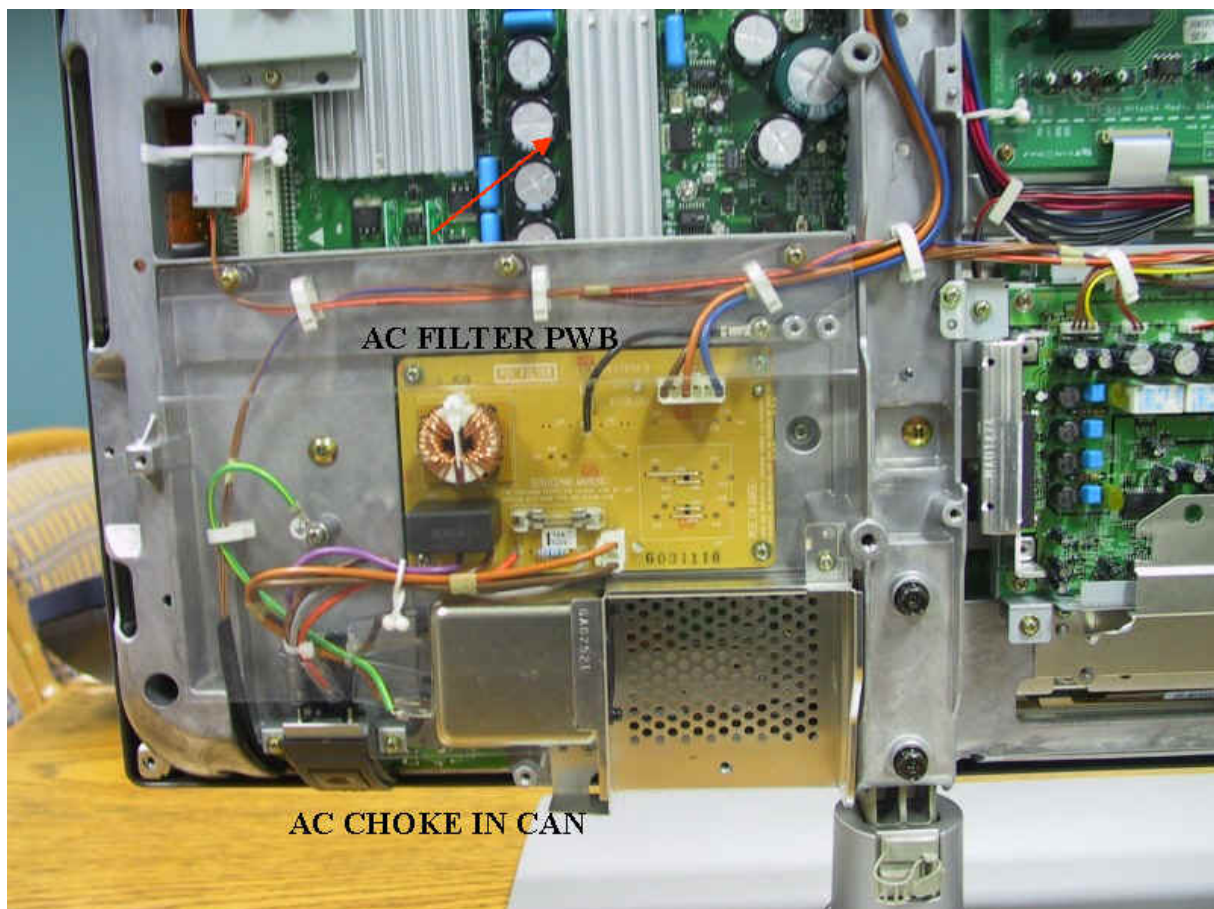


42HDT20 DISASSEMBLY PROCEDURE

CLOSE UP VIEW OF THE AC FILTER PWB and AC CHOKE

This picture shows the Power Filter PWB on the upper left hand side as viewed from the rear.

Here the AC Choke (shown in the metal can) is seen.
Also the AC Filter PWB.



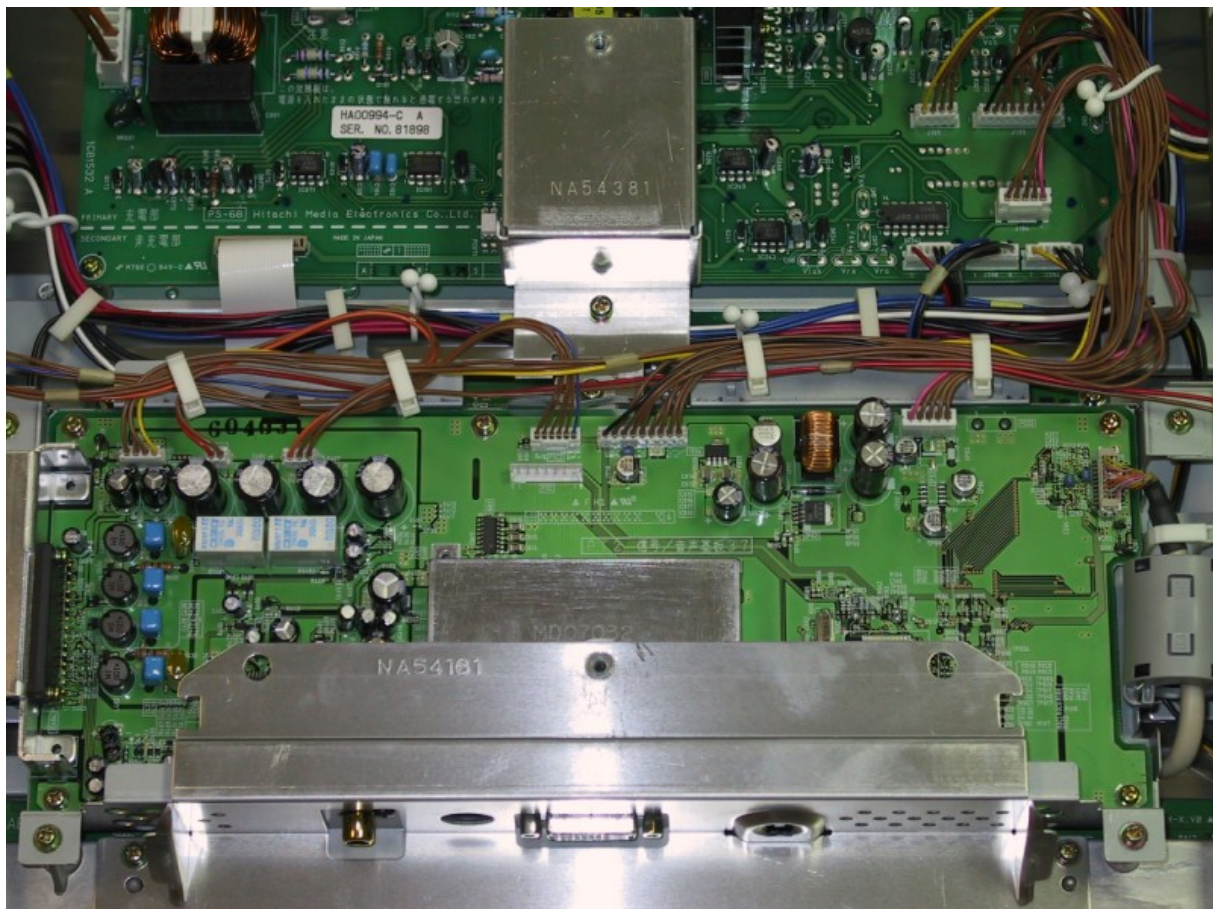
42HDT20 DISASSEMBLY PROCEDURE

CLOSE UP VIEW OF THE AUDIO / VIDEO INTERFACE PWB

This picture shows the Audio / Video Interface PWB on the lower center as viewed from the rear.

This PWB is the Interface between the Audio Video Control Center and the Plasma Unit.

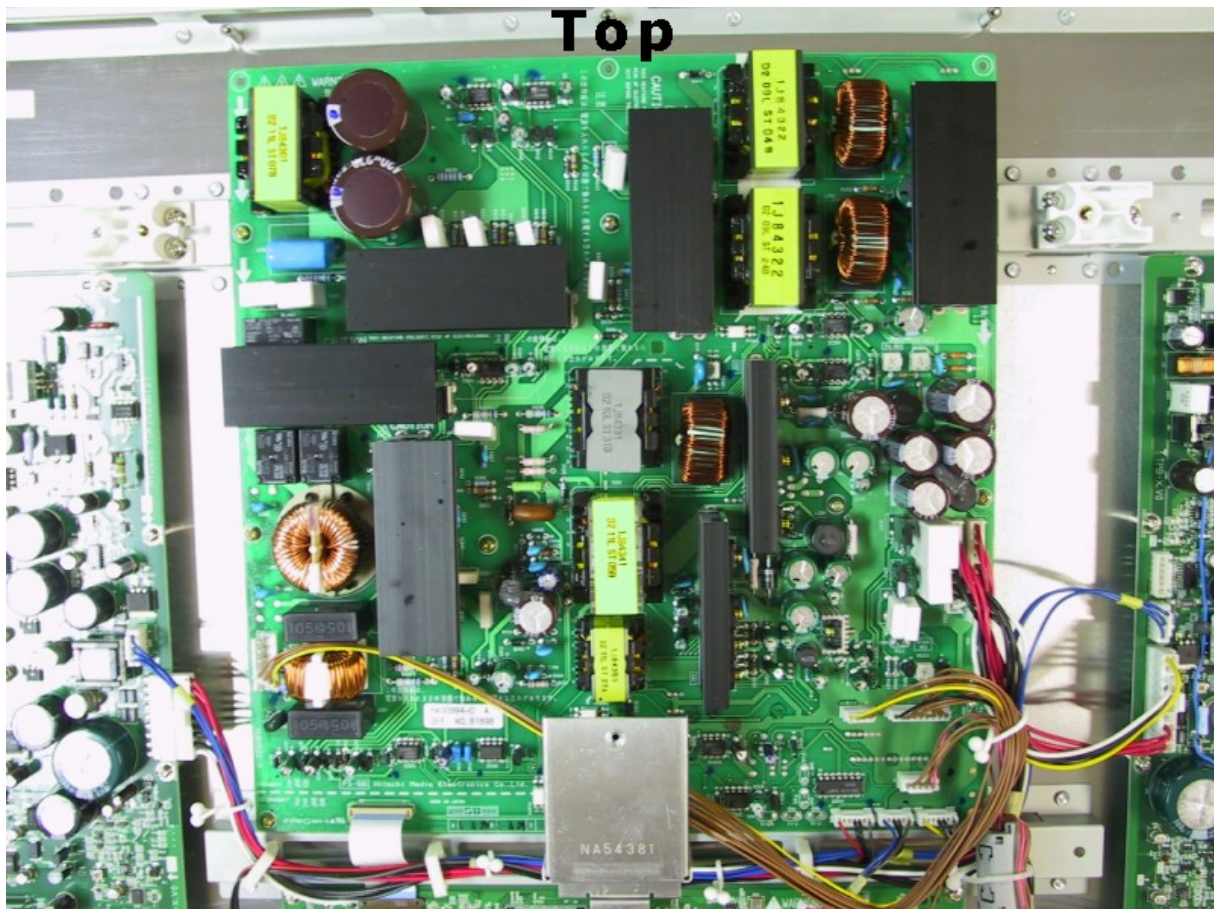
Note the connectors at the bottom of the picture.



42HDT20 DISASSEMBLY PROCEDURE

CLOSE UP VIEW OF THE POWER SUPPLY PWB

This picture shows the Power PWB located in the upper center as viewed from the rear.



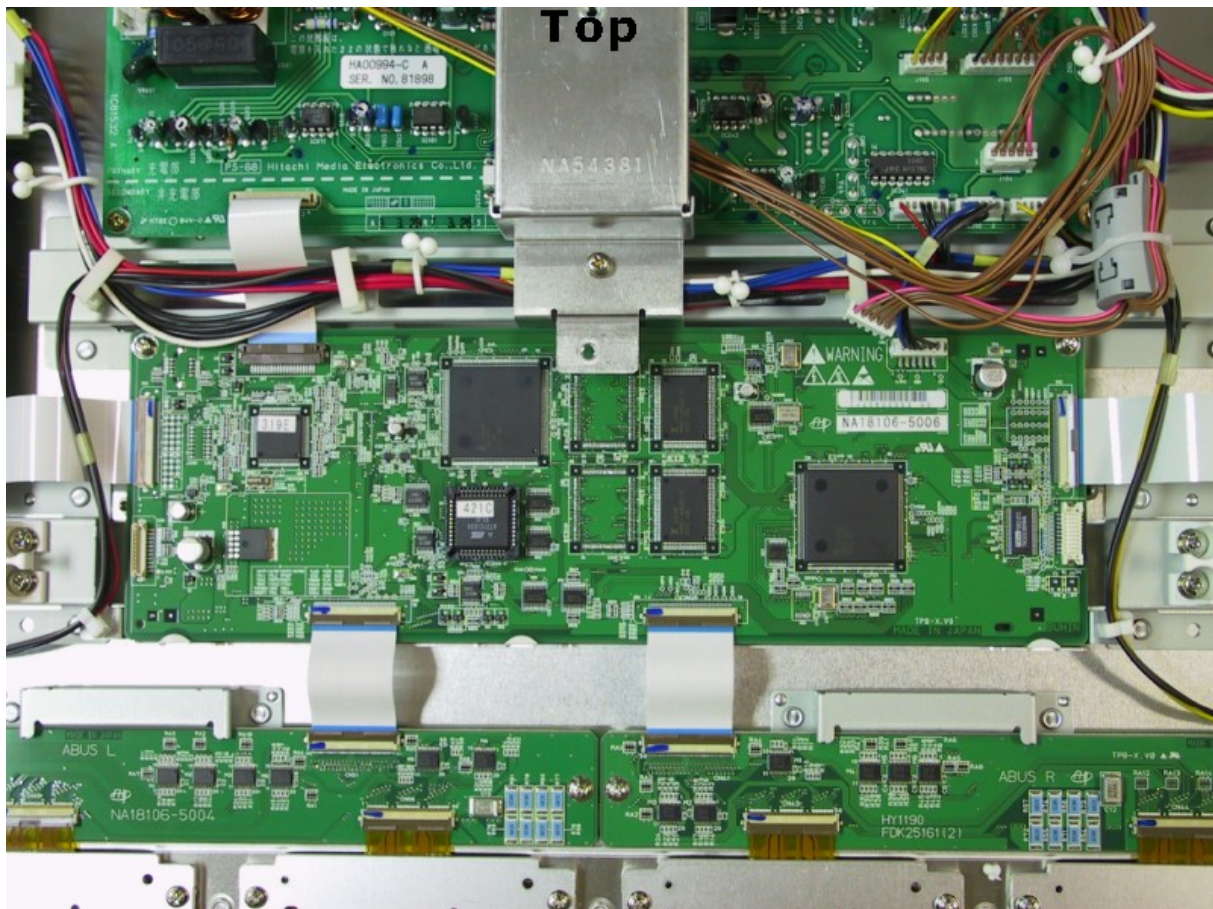
42HDT20 DISASSEMBLY PROCEDURE

CLOSE UP VIEW OF THE LOGIC PWB

This picture shows the Logic PWB on the bottom center as viewed from the rear.

Note: The Audio / Video Interface PWB is removed.

Normally the A/V Interface PWB is directly over the Logic PWB.



42HDT20 DISASSEMBLY PROCEDURE

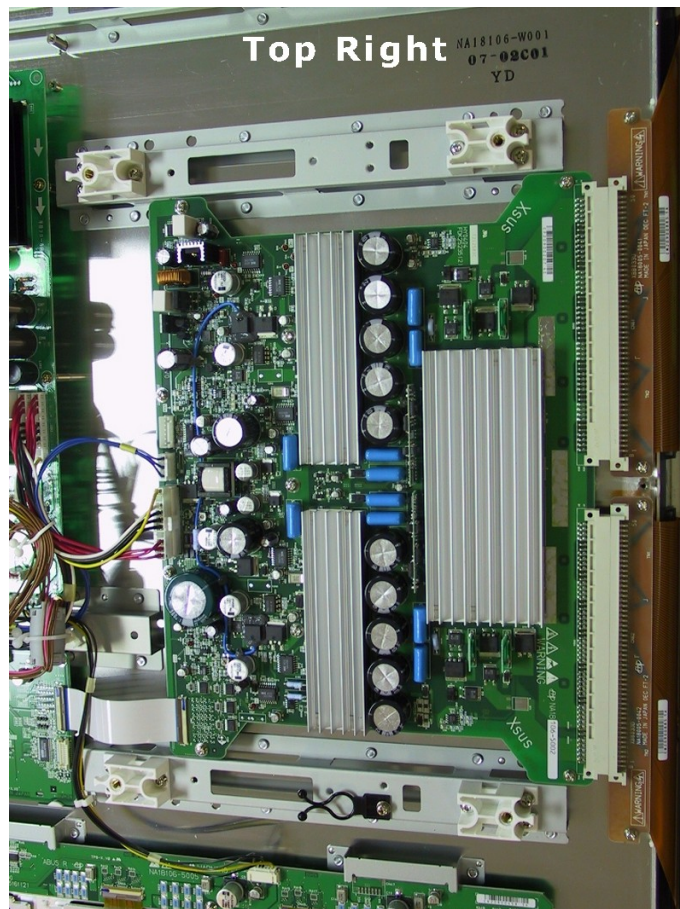
CLOSE UP VIEW OF THE X-SUS PWB

This picture shows the X-SUS PWB on the top right hand side as viewed from the rear.

Note: This PWB affects the horizontal (left to right) address of the panel assembly.

There are 2 large ribbon cables that go off to the right and are wired directly into the plasma panel glass.

Do not tear or break these cables, as there is no repair for such damage.



42HDT20 DISASSEMBLY PROCEDURE

CLOSE UP VIEW OF THE Y-SUS PWB

This picture shows the Y-SUS PWB on the top left hand side as viewed from the rear. Note: This PWB affects the horizontal (left to right) address of the panel assembly.

Notice that you can see the Power Supply Adjustment label (covered later) in the lower left hand corner. This label gives the values for V_a and V_s adjustments.

There are 2 large ribbon cables that go off to the left and are wired directly into the plasma panel glass.

Do not tear or break these cables, as there is no repair for such damage.



42HDT20 DISASSEMBLY PROCEDURE

CLOSE UP VIEW OF THE A BUS-L PWB

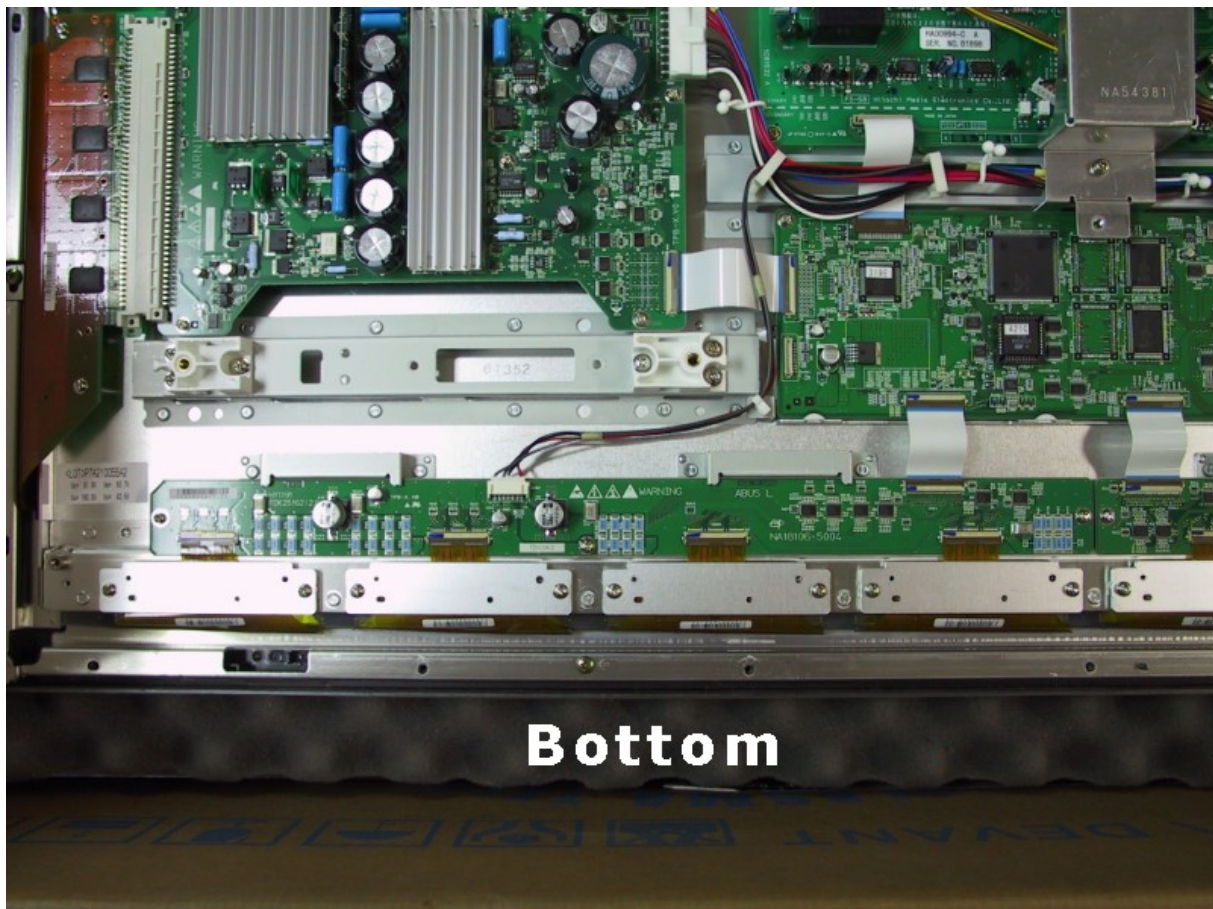
This picture shows the A-BUS L PWB on the bottom left hand side as viewed from the rear.

Note: This PWB affects the Vertical address (up and down) on the Right hand side as view from the Front of the set.

Notice that you can see the Power Supply Adjustment label (covered later) in the lower left hand corner. This label gives the values for Va and Vs adjustments.

There are 4 ribbon cables that go down and are wired directly into the plasma panel glass.

Do not tear or break these cables, as there is no repair for such damage.



42HDT20 DISASSEMBLY PROCEDURE

CLOSE UP VIEW OF THE A-BUS-R PWB

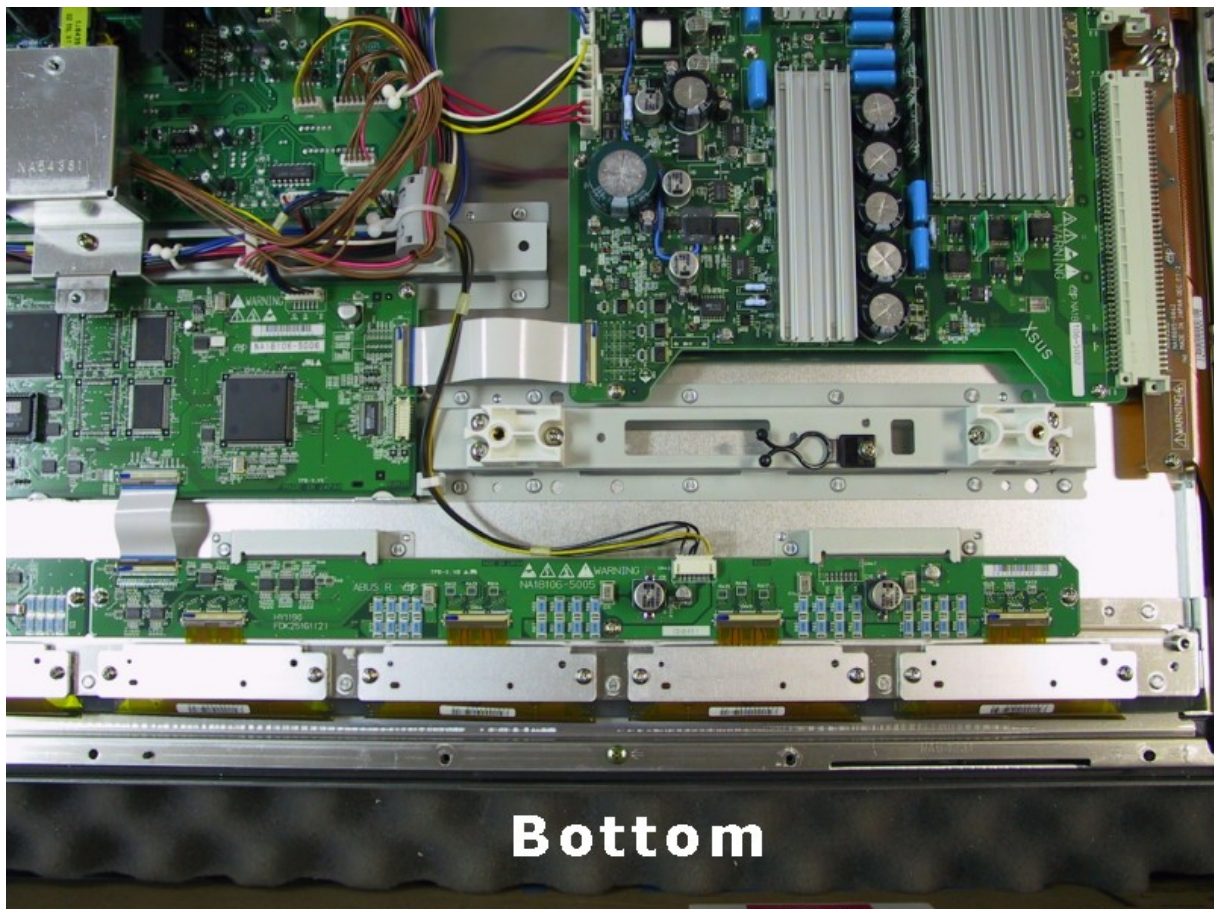
This picture shows the A-BUS R PWB on the bottom left hand side as viewed from the rear.

Note: This PWB affects the Vertical address (up and down) on the Left hand side as view from the Front of the set.

Notice that you can see the Power Supply Adjustment label (covered later) in the lower left hand corner. This label gives the values for Va and Vs adjustments.

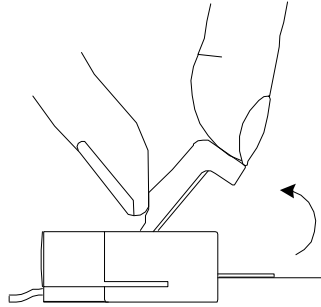
There are 4 ribbon cables that go down and are wired directly into the plasma panel glass.

Do not tear or break these cables, as there is no repair for such damage.

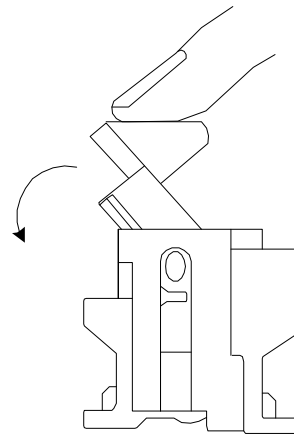
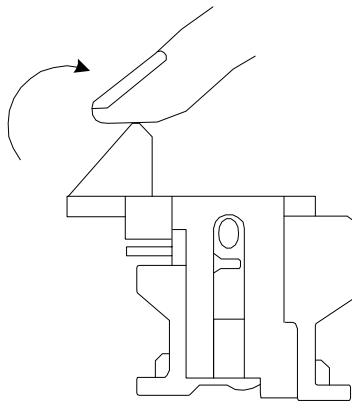
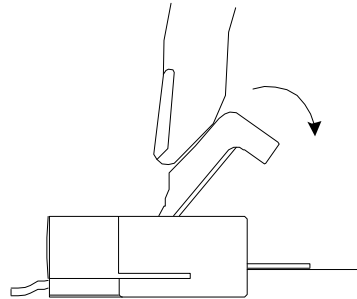


CONNECTOR “RIBBON CABLE” REMOVAL

OPEN



CLOSE



Do Not Twist.

Do not force closed without ribbon cable inserted.

Use light pressure.

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SECTION SIX

(6)

PLASMA POWER SUPPLY ADJUSTMENT

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42HDT20 POWER SUPPLY ADJUSTMENT PROCEDURE

CLOSE UP VIEW OF THE POWER SUPPLY ADJUSTMENT LABEL

This picture shows a close up picture of the Power PWB adjustment label.

Note: This Label is located in the lower left hand corner as viewed from the rear.

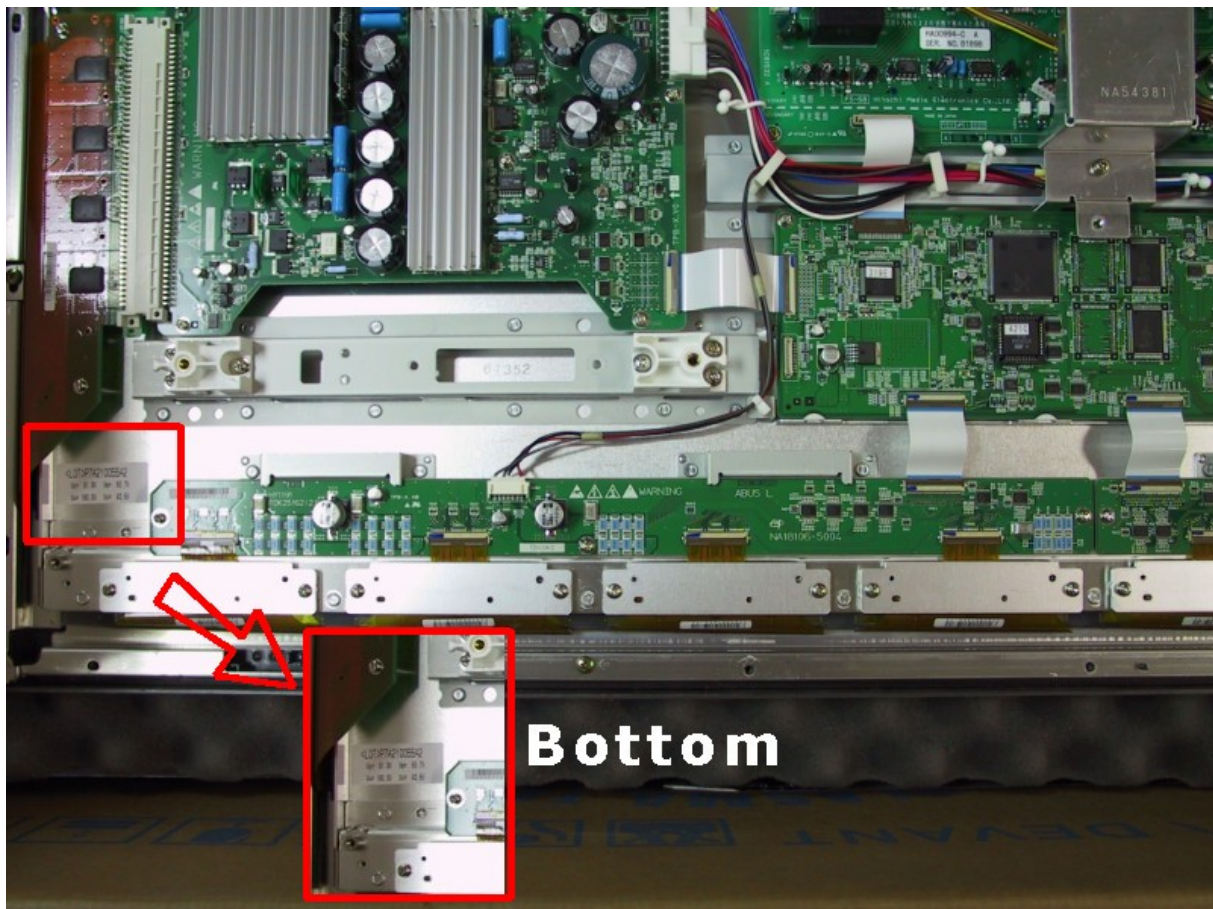
The adjustment of Va and Vs in accordance with the Plasma Panel label.

The next picture will show a much closer view of the Plasma Panel label adjustment values.

These adjustments MUST BE MADE when the Power PWB is replaced.

(See the Power Supply Adjustment Pots view page for the Power Supply Adjustment locations).

NOTE: If it is determined that a specific PWB is needed for Service repair, or there is a need for additional trouble shooting help, please call the Hitachi Plasma Specialist Group at the following number; (800) 654-7013



42HDT20 POWER SUPPLY ADJUSTMENT PROCEDURE

EXTREME CLOSE UP VIEW OF THE POWER SUPPLY ADJUSTMENT LABEL

This picture shows a more close up picture of the Power PWB adjustment label.

Note:

- **42HDT20**

This Label is located in the Lower left hand corner as viewed from the rear.

The adjustment of V_a and V_s in accordance with the Plasma Panel label.

The next picture will show a much closer view of the Plasma Panel label adjustment values.

These adjustments MUST BE MADE when the Power PWB is replaced.

(See the Power Supply Adjustment Pots view page for the Power Supply Adjustment locations).

NOTE: If it is determined that a specific PWB is needed for Service repair, or there is a need for additional trouble shooting help, please call the Hitachi Plasma Specialist Group at the following number; (800) 654-7013

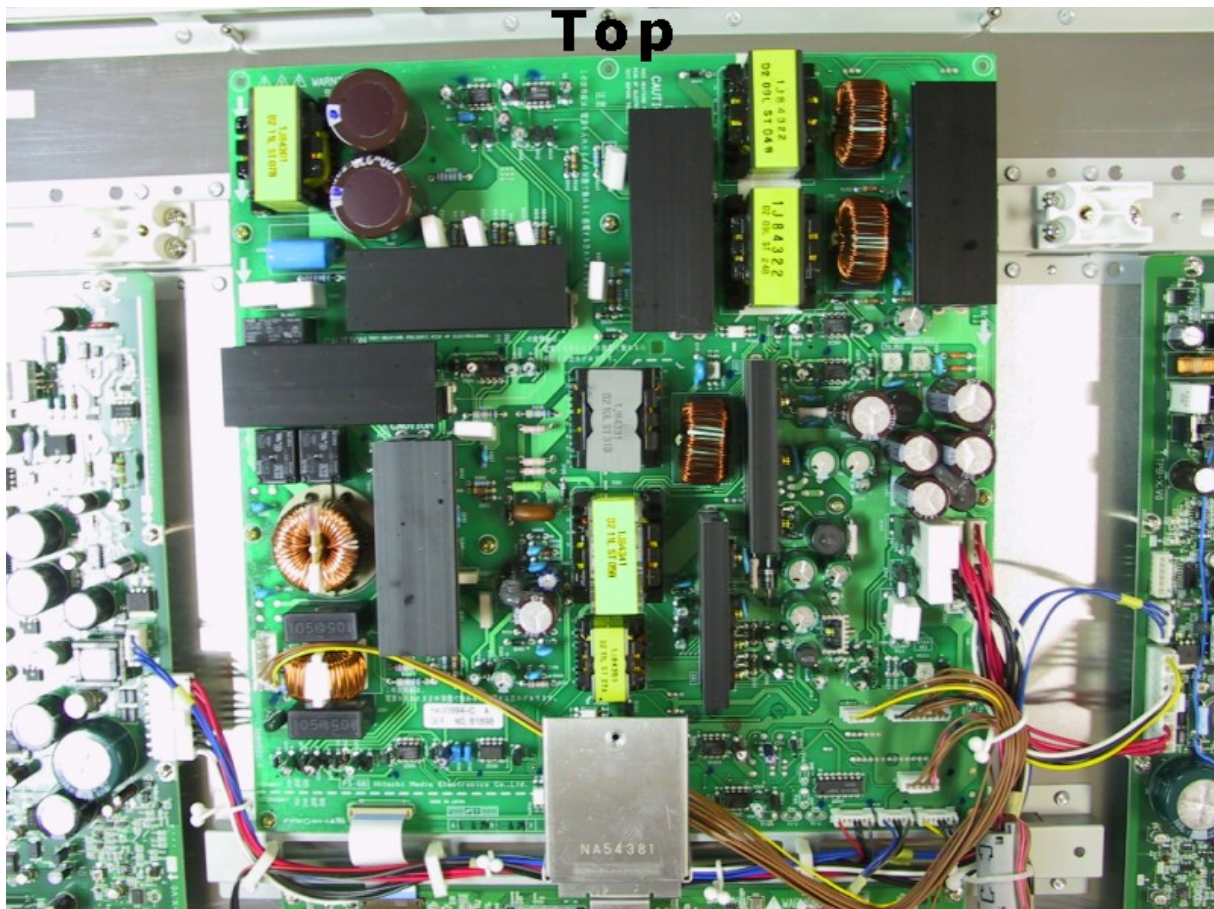


42HDT20 POWER SUPPLY ADJUSTMENT PROCEDURE

CLOSE UP VIEW OF THE POWER SUPPLY PWB

This picture shows the Power PWB and the location of the adjustment pots and test points. The next picture will show a close-up of the adjustment controls and test points.

NOTE: If it is determined that a specific PWB is needed for Service repair, or there is a need for additional trouble shooting help, please call the Hitachi Plasma Specialist Group at the following number; (800) 654-7013



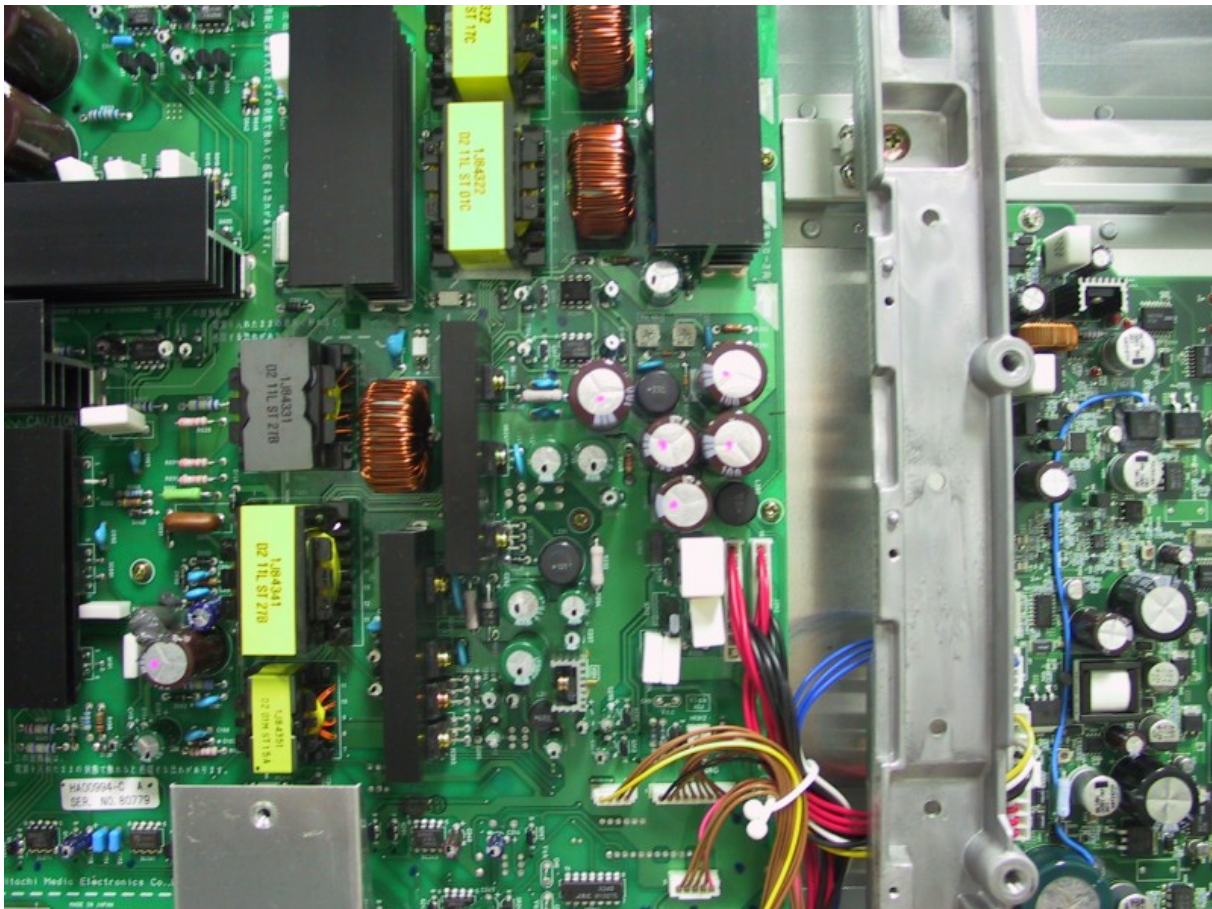
42HDT20 POWER SUPPLY ADJUSTMENT PROCEDURE

CLOSE UP VIEW OF THE POWER SUPPLY PWB (2)

This picture shows a closer view of the Power PWB and the location of the adjustment pots and test points.

The next picture will show an extreme close-up of the adjustment controls and test points.

NOTE: If it is determined that a specific PWB is needed for Service repair, or there is a need for additional trouble shooting help, please call the Hitachi Plasma Specialist Group at the following number; (800) 654-7013



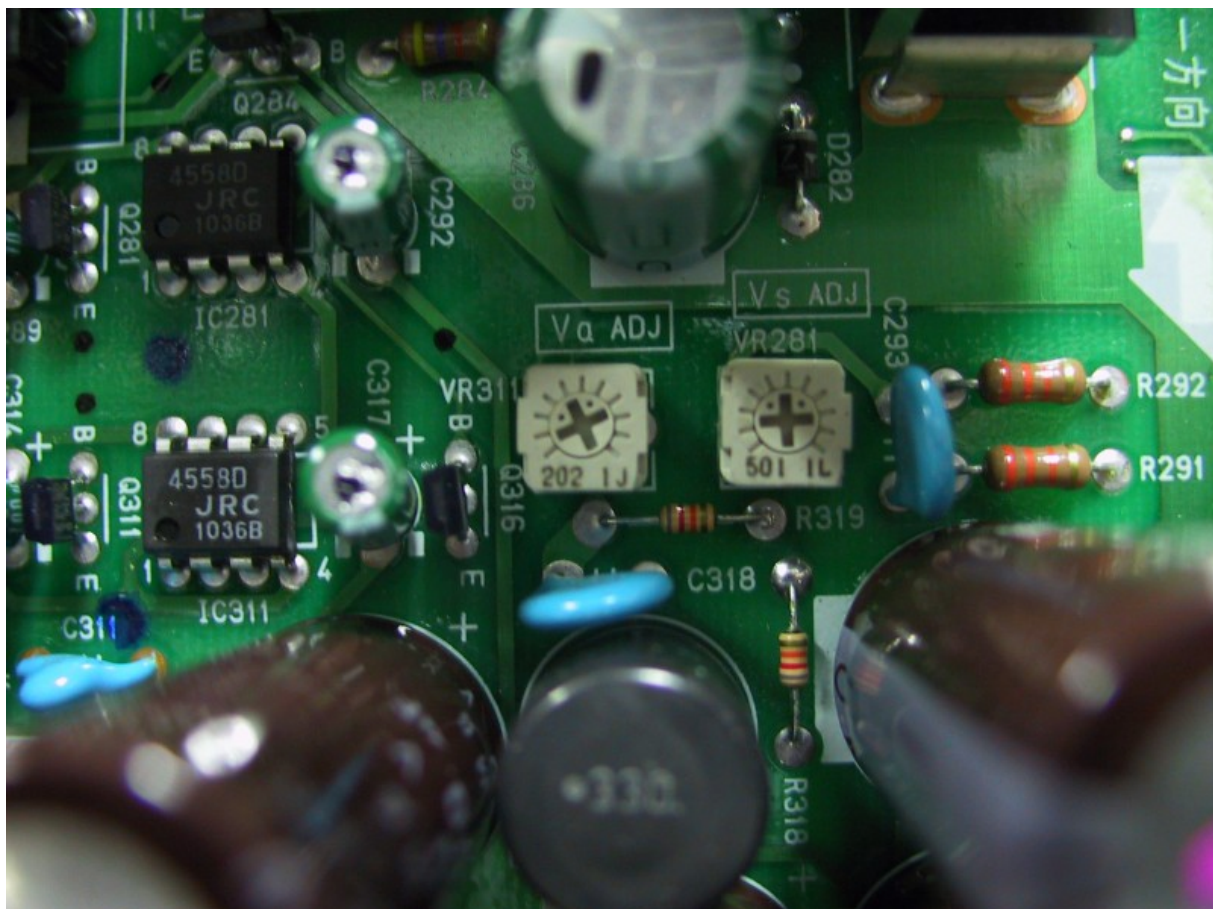
42HDT20 POWER SUPPLY ADJUSTMENT PROCEDURE

EXTREME CLOSE UP VIEW OF THE POWER SUPPLY PWB (3)

This picture shows an extreme close up view of the Power PWB and the location of the adjustment pots and test points.

The next page explains the adjustment procedure for the Power Supply.

NOTE: If it is determined that a specific PWB is needed for Service repair, or there is a need for additional trouble shooting help, please call the Hitachi Plasma Specialist Group at the following number; (800) 654-7013



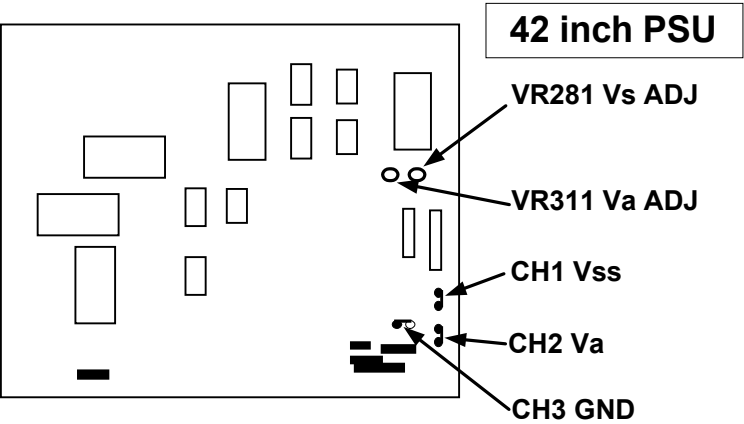
42HDT20 POWER SUPPLY ADJUSTMENT PROCEDURE

POWER SUPPLY ADJUSTMENT PROCEDURE

ADJUSTMENT PROCEDURE FOR Vs and Va:

NOTE: Right now, there are no Adjustments Needed.

Item	Adjustment Items	Adjustment Point	Adjustment Value (Conditions)
1	Vs Voltage Adjustment VR281	*PSU Board CH1Vss	Voltage setting indicated on Chassis Label. (+/- 0.1V) See label below for Label identification. See Label location identification page.
2	Va Voltage Adjustment VR311	*PSU Board CH2Va	Voltage setting indicated on Chassis Label. (+/- 0.2V) See label below for Label identification. See Label location identification page.
3	Ground	CH3 GND	



LABEL POSITION LOWER LEFT CORNER

<LOT> P5A151095D1

Vs = 7 9 . 8 V

Vw = 1 8 0 . 2 V

Va = 5 5 . 4 V

Vx = 4 4 . 9 V

Only Adjust these two values

Values are just a representation, not actual.

Use only the values on the specific label on the specific Plasma panel.

32HDT20 POWER SUPPLY ADJUSTMENT PROCEDURE

CLOSE UP VIEW OF THE POWER SUPPLY ADJUSTMENT LABEL

This picture shows a close up picture of the Power PWB adjustment label.

Note: This Label is located in the upper left hand corner as viewed from the rear.

The adjustment of V_a and V_s in accordance with the Plasma Panel label.

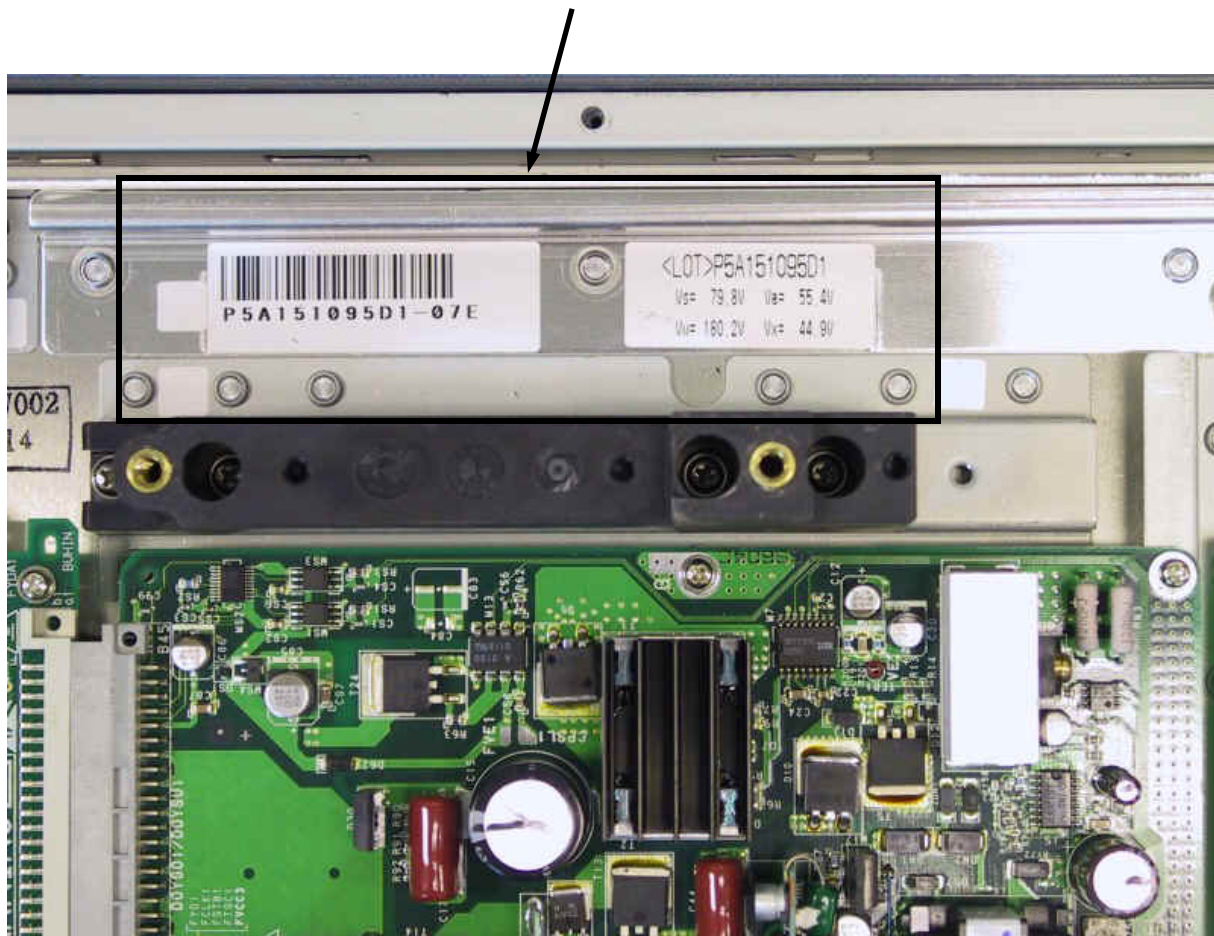
The next picture will show a much closer view of the Plasma Panel label adjustment values.

These adjustments MUST BE MADE when the Power PWB is replaced.

(See the Power Supply Adjustment Pots view page for the Power Supply Adjustment locations).

NOTE: If it is determined that a specific PWB is needed for Service repair, or there is a need for additional trouble shooting help, please call the Hitachi Plasma Specialist Group at the following number; (800) 654-7013

LABEL LOCATION
UPPER LEFT



32HDT20 POWER SUPPLY ADJUSTMENT PROCEDURE

EXTREME CLOSE UP VIEW OF THE POWER SUPPLY ADJUSTMENT LABEL

This picture shows a more close up picture of the Power PWB adjustment label.

Note:

- **32HDT20**

This Label is located in the Upper left hand corner as viewed from the rear.

The adjustment of V_a and V_s in accordance with the Plasma Panel label.

The next picture will show a much closer view of the Plasma Panel label adjustment values.

These adjustments MUST BE MADE when the Power PWB is replaced.

(See the Power Supply Adjustment Pots view page for the Power Supply Adjustment locations).

NOTE: If it is determined that a specific PWB is needed for Service repair, or there is a need for additional trouble shooting help, please call the Hitachi Plasma Specialist Group at the following number; (800) 654-7013

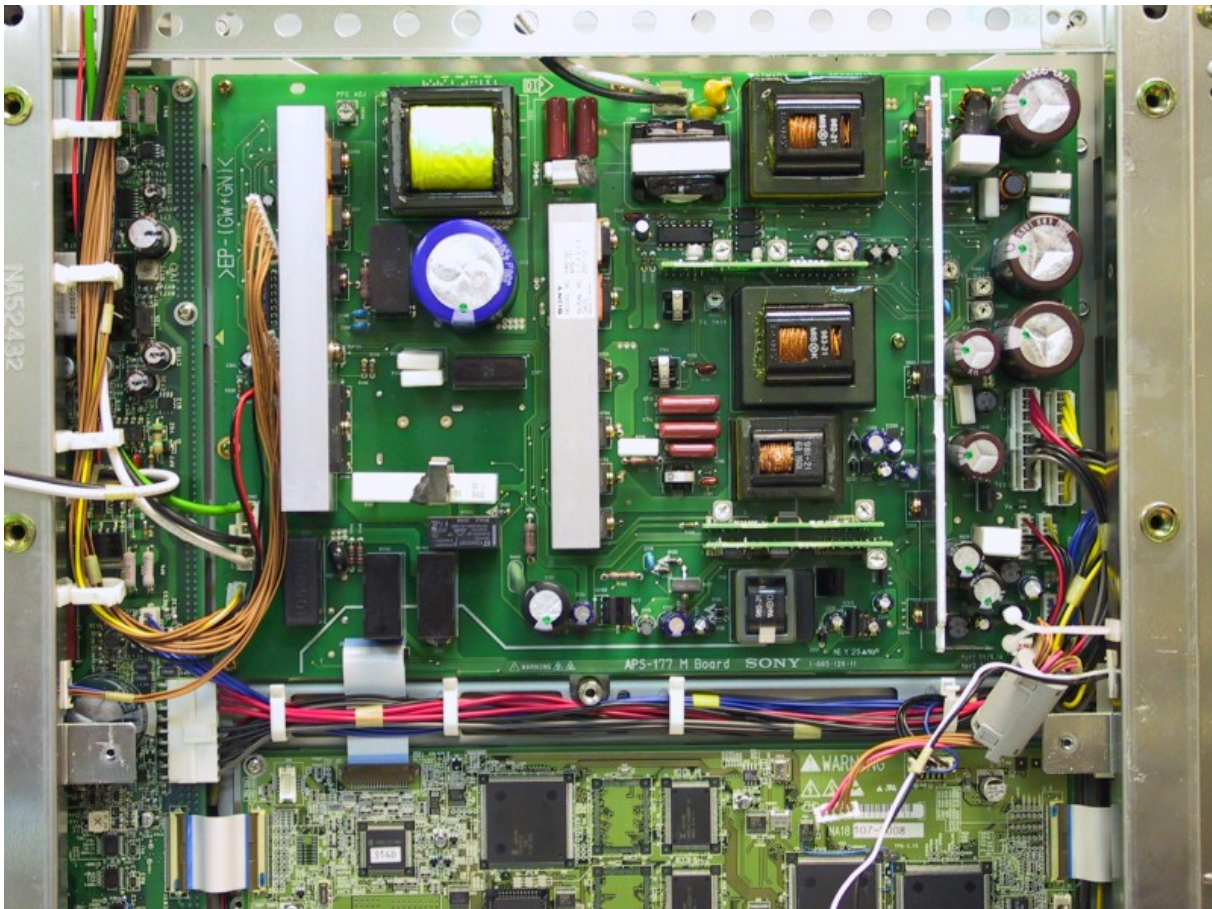


32HDT20 POWER SUPPLY ADJUSTMENT PROCEDURE

CLOSE UP VIEW OF THE POWER SUPPLY PWB

This picture shows the Power PWB and the location of the adjustment pots and test points. The next picture will show a close-up of the adjustment controls and test points.

NOTE: If it is determined that a specific PWB is needed for Service repair, or there is a need for additional trouble shooting help, please call the Hitachi Plasma Specialist Group at the following number; (800) 654-7013



32HDT20 POWER SUPPLY ADJUSTMENT PROCEDURE

CLOSE UP VIEW OF THE POWER SUPPLY PWB (2)

This picture shows a closer view of the Power PWB and the location of the adjustment pots and test points.

The next picture will show an extreme close-up of the adjustment controls and test points.

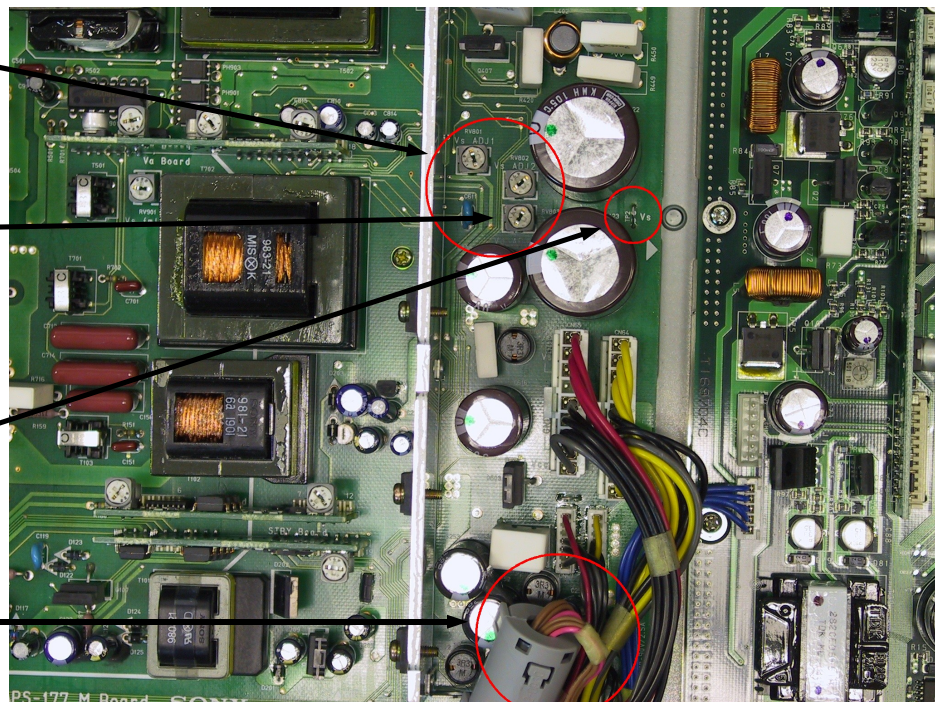
NOTE: If it is determined that a specific PWB is needed for Service repair, or there is a need for additional trouble shooting help, please call the Hitachi Plasma Specialist Group at the following number; (800) 654-7013

Vs Adjustment Pots
Vs1 Coarse Adj.
Vs2 Fine Adj.

Va Adjustment Pot

Vs Adjustment
Test Points

Va Adjustment
Test Points



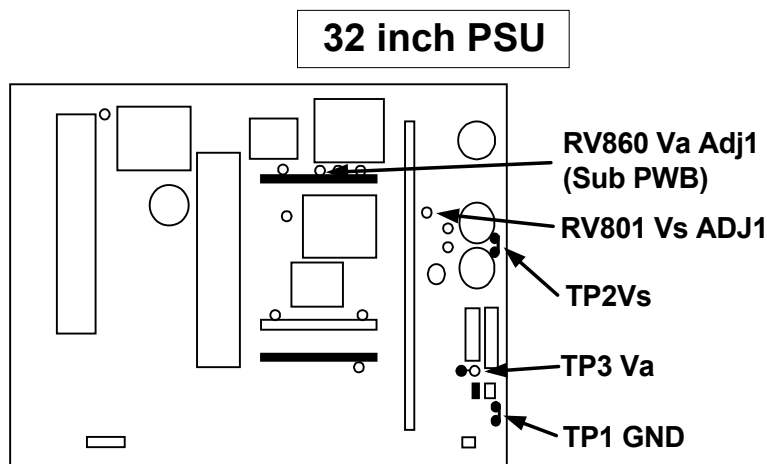
32HDT20 POWER SUPPLY ADJUSTMENT PROCEDURE

POWER SUPPLY ADJUSTMENT PROCEDURE

ADJUSTMENT PROCEDURE FOR Vs and Va:

NOTE: Right now, there are no Adjustments Needed.

Item	Adjustment Items	Adjustment Point	Adjustment Value (Conditions)
1	Vs Voltage Adjustment VR801	*PSU Board TP2Vss	Voltage setting indicated on Chassis Label. (+/- 0.1V) <i>See label below for Label identification.</i> <i>See Label location identification page.</i>
2	Va Voltage Adjustment VR860	*PSU Board TP3Va	Voltage setting indicated on Chassis Label. (+/- 0.2V) <i>See label below for Label identification.</i> <i>See Label location identification page.</i>
3	Ground	TP1 GND	



LABEL POSITION UPPER LEFT CORNER

<LOT> P5A151095D1

Vs = 7 9 . 8 V

Vw = 1 8 0 . 2 V

Va = 5 5 . 4 V

Vx = 4 4 . 9 V

Only Adjust these two values

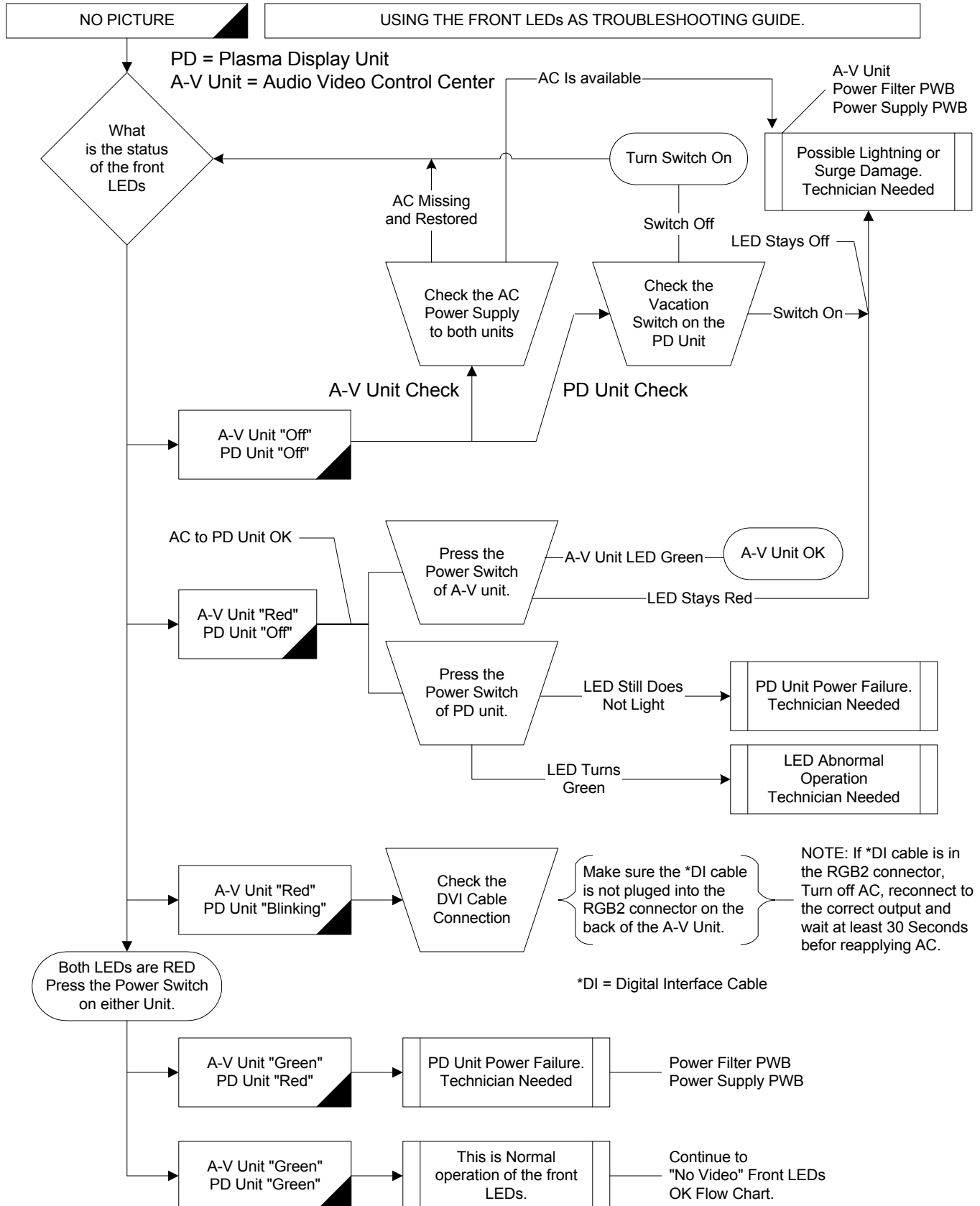
Values are just a representation, not actual.

Use only the values on the specific label on the specific Plasma panel.





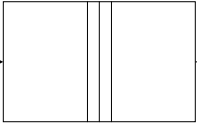

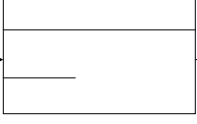



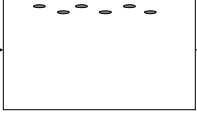
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SECTION 7 TROUBLE SHOOTING

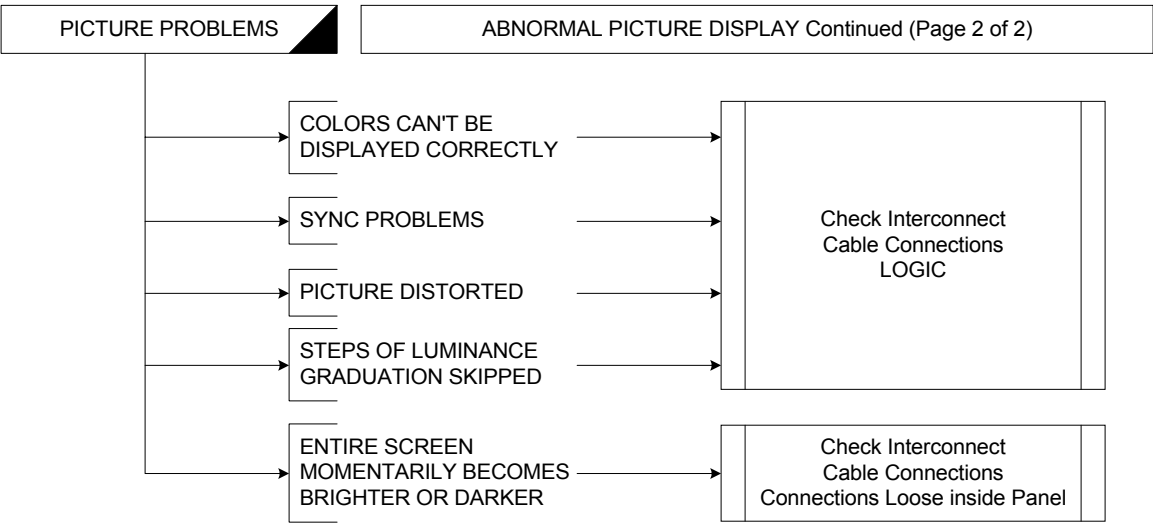
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LED Trouble Shooting Chart should be completed

PICTURE PROBLEMS	ABNORMAL PICTURE DISPLAY (Page 2 of 3)	
	PROBLEM DISPLAYED	SUSPECTED AREA OF FAULT
ENTIRE SCREEN IS BLACK		Interconnect Cable, X-SUS PWB Power Supply PWB Logic PWB Panel Assembly
SCREEN LIGHTS DIMLY EVEN ON BLACK SCREEN.		Logic PWB
SINGLE VERTICAL LINE OF DIFFERENT COLORS		ABUS-R PWB Logic PWB Panel Assembly
VERTICAL LINE FROM THE MIDDLE OF THE SCAN AREA		ABUS-L PWB Logic PWB Panel Assembly
VERTICAL LINE FROM THE MIDDLE OF THE SCAN AREA		ABUS-L or R PWB (Left Side or Right Side) Logic PWB Panel Assembly
VERTICAL LINE FROM THE MIDDLE OF THE SCAN AREA		ABUSR Left Side Problem ABUSL Right Side Problem LOGIC Panel Assembly
HORIZONTAL LINE DOESN'T LIGHT		X-SUS or Y-SUS PWB Panel Assembly
HORIZONTAL LINE DOESN'T LIGHT		X-SUS or Y-SUS PWB Panel Assembly
TOP 1/2 OR BOTTOM 1/2 DOESN'T LIGHT		Y-SUS or X-SUS PWB Panel Assembly
BURN IMAGE		Panel Assembly (Burnt Image)
OVAL SHAPED POINTS HAVING ABNORMAL LUMINANCE ARE SCATTERED IN THE UPPER OR LOWER PART OF SCREEN		X-SUS or Y-SUS PWB Panel Assembly

Continued on next page →



32 and 42HDT20 PLASMA UNIT TROUBLE SHOOTING

CIR- CUIT	No.	PHENOMENON	CHECK POINT	POTENTIAL PROBLEM
*PDP or #AVC		It does not switch on or no picture (Blank Screen)	Disconnect cable between #AVC and *PDP and press and hold the "Test Button" on the rear back bottom of *PDP for more than five seconds. Some Test patterns are displayed? Click here for an image for the location of the Test Button.	If yes, *PDP is probably OK. If no, there is something wrong with the *PDP. Please refer to *PDP Problem analysis as shown below.
PDP	(a)	Front LED indicator does not light by mains power switch ON with/without cables connected between AVC and *PDP.	Disconnect AC power cord from *PDP unit. Remove rear cover and check primary fuse F901. F901 is located on the sub power board (32") or filter board (42")	If F901 is opened, some components of the primary circuit of the Power Supply Unit (**PSU) are defective. If, F901 is OK, components of stand by circuit of **PSU are defective. Necessary to change **PSU.
	(b)	Front LED indicator lights in green by remote control power ON or #AVC front switch power ON with cables connected to #AVC unit.	Check following voltages by touching test pins on the **PSU (Power Supply PWB) by tester. Test pins are indicated by silk printing on board. 1) Va test pin to chassis frame ground. Voltage is approx 50Vdc for 32" or 60Vdc for 42". 2) Vs voltage to ground is approx 80Vdc to 83Vdc for all sizes.	If Va and Vs voltages are OK, signal/audio board is defective. **PSU and Panel module are both OK. Necessary to change Signal/Audio PWB. If Va and/or Vs voltage is zero or quite low, **PSU or panel is defective. Please see below Suggestion . Necessary to change **PSU or Panel mod-
			Suggestion: Since Plasma display module consist of some individual circuit boards. The schematic and logic are very complex including microprocessor self logic protection system. Generally speaking it is not so easy to clarify which (**PSU or Panel module) part is defective. Substitute the **PSU PWB to determine which is at fault.	After **PSU replacement, pictures returns to normal, **PSU was defective. If not, panel assembly is defective.
	c)	Vertical Black line or bar appears in the display area.	First, remove back and check all connectors. If any are found loose or unseated, reseal and test. Most often, this matter is a defect of the Panel module components.	Necessary to change Panel module.

*PDP = Plasma Display Panel

**PSU = Power Supply PWB.

#AVC = Audio Video Control Unit

32 and 42HDT20 PLASMA UNIT TROUBLE SHOOTING

CIR- CUIT	No.	PHENOMENON	CHECK POINT	POTENTIAL PROBLEM
*PDP or #AVC		It does not switch on or no picture (Blank Screen)	Disconnect cable between #AVC and *PDP and press and hold the "Test Button" on the rear of *PDP for more than five seconds. Some Test patterns are displayed? Click here for an image for the location of the Test Button.	If yes, *PDP is probably OK. If no, there is something wrong with the *PDP. Please refer to *PDP Problem analysis as shown below.
#AVC	(a)	It does not switch on or no picture (blank screen). LED (both *PDP and #AVC) is always lit in red. *PDP and #AVC is once switched on with LED lit in green but goes into Standby quickly with LED lit in red.	+19V output at pin 8 of Q403 fractured (TP401) Power control from Micro. Power1; TP741 / TP409 / TP407 / TP436, Power 2; TP738 / TP450 / TP509 Is +10V (TP442) is more than +12V?	Check components related to protection circuit. (TR400/D400 ~D404) Check components (dry joint or solder bridge or broken semiconductors) related to this circuit. Q405 broken caused by R425 dry joint or pin 20 of IC400 dry joint. (pin 20 dry joint causes R425 to fail) R418 dry joint/solder bridge.
	(b)	*PDP LED is flashing	Digital Interface cables disconnected between *PDP and	Re-connect Cables
	(c)	Picture Unstable	X'tal oscillating? Comb Filter working?	Dry joint / solder bridge X100 / C135 / X101 / C136. Components dry joints / solder bridge / broken in CHROMA lines, e.g. R208 / Q121 / Q122. Components of Comb Clock at pin 19
	(d)	Noisy picture on RF (TV)	VIF inputs around pin 1 ~ 4 of IC100 input proper signal? +30V supplied to tuner?	Dry joint / solder bridge at pin 1 ~ 4 or broken device of IC100. 30V power supply IC600 broken or components in line of 30V
	(e)	No Sound	And slow response toward R/C handset? Pin 58/59 of IC301 input proper signal (0.1 ~ 0.8Vpp)?	R319 disconnected. IF-sound-out line components failure.
	(f)	No Closed Caption	Pin 32 of IC100 signal observed?	Pin 32 solder bridge (to pin 31) or dry joint or in line of CVBS-micro.

*PDP = Plasma Display Panel

**PSU = Power Supply PWB.

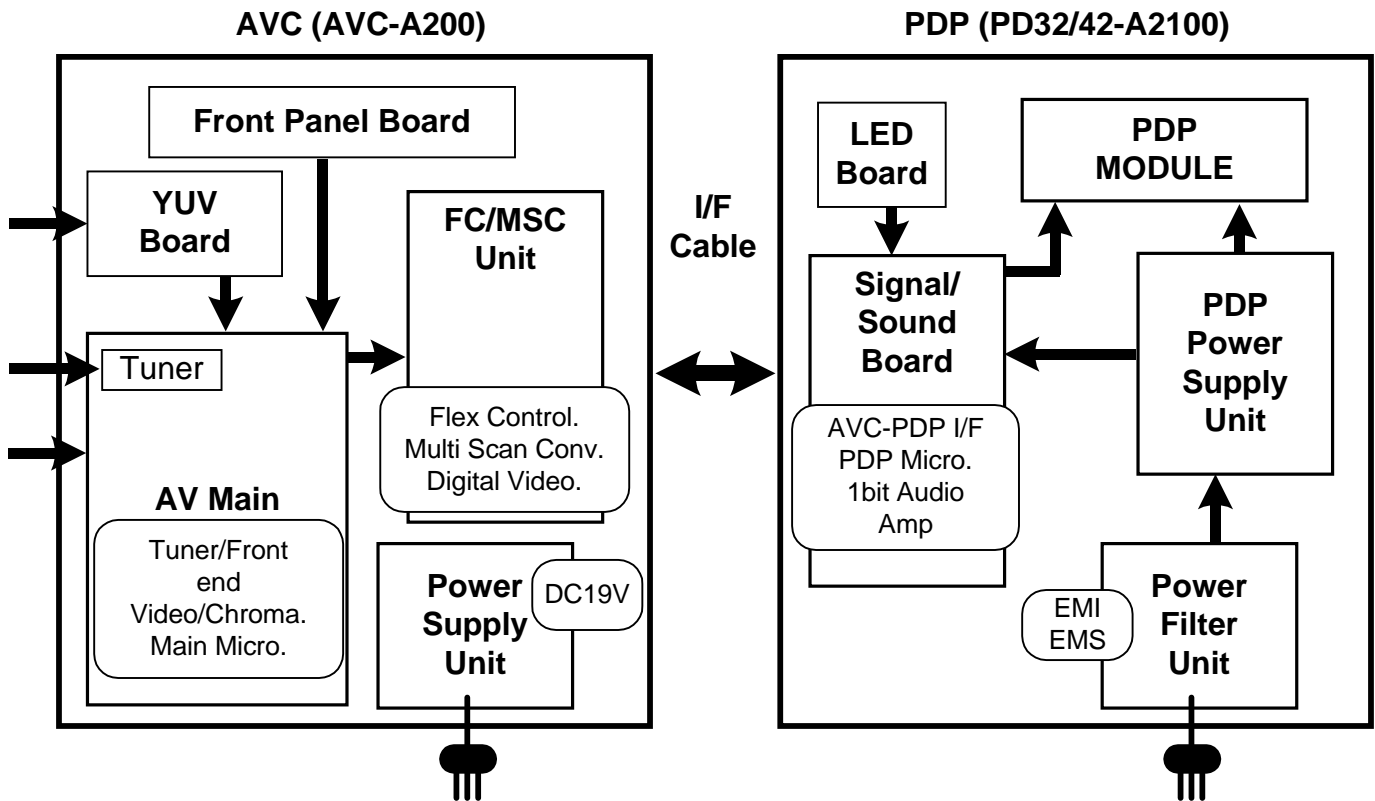
#AVC = Audio Video Control Unit

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SECTION 8 BLOCK DIAGRAMS

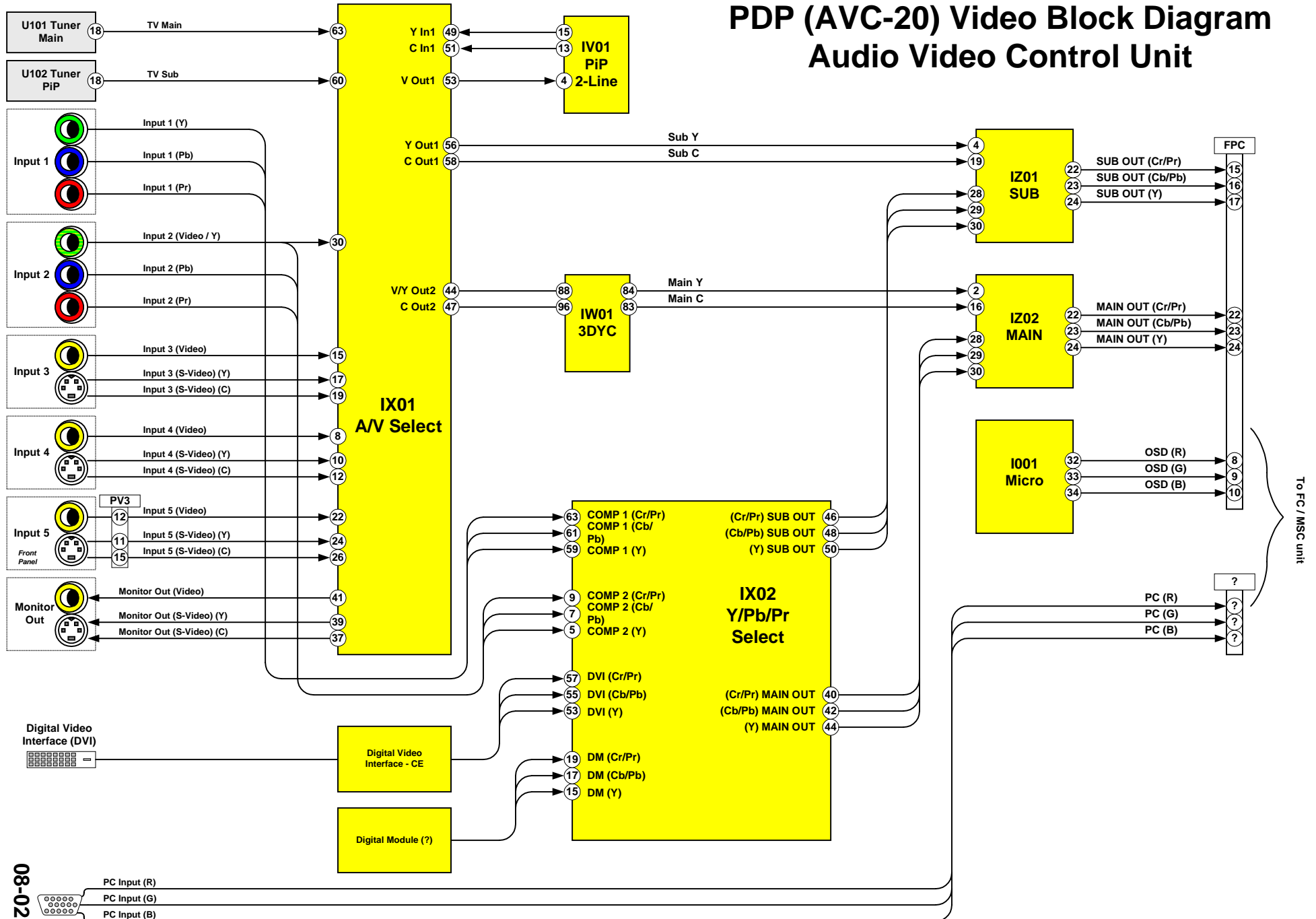
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AVC TO PDP BLOCK DIAGRAM

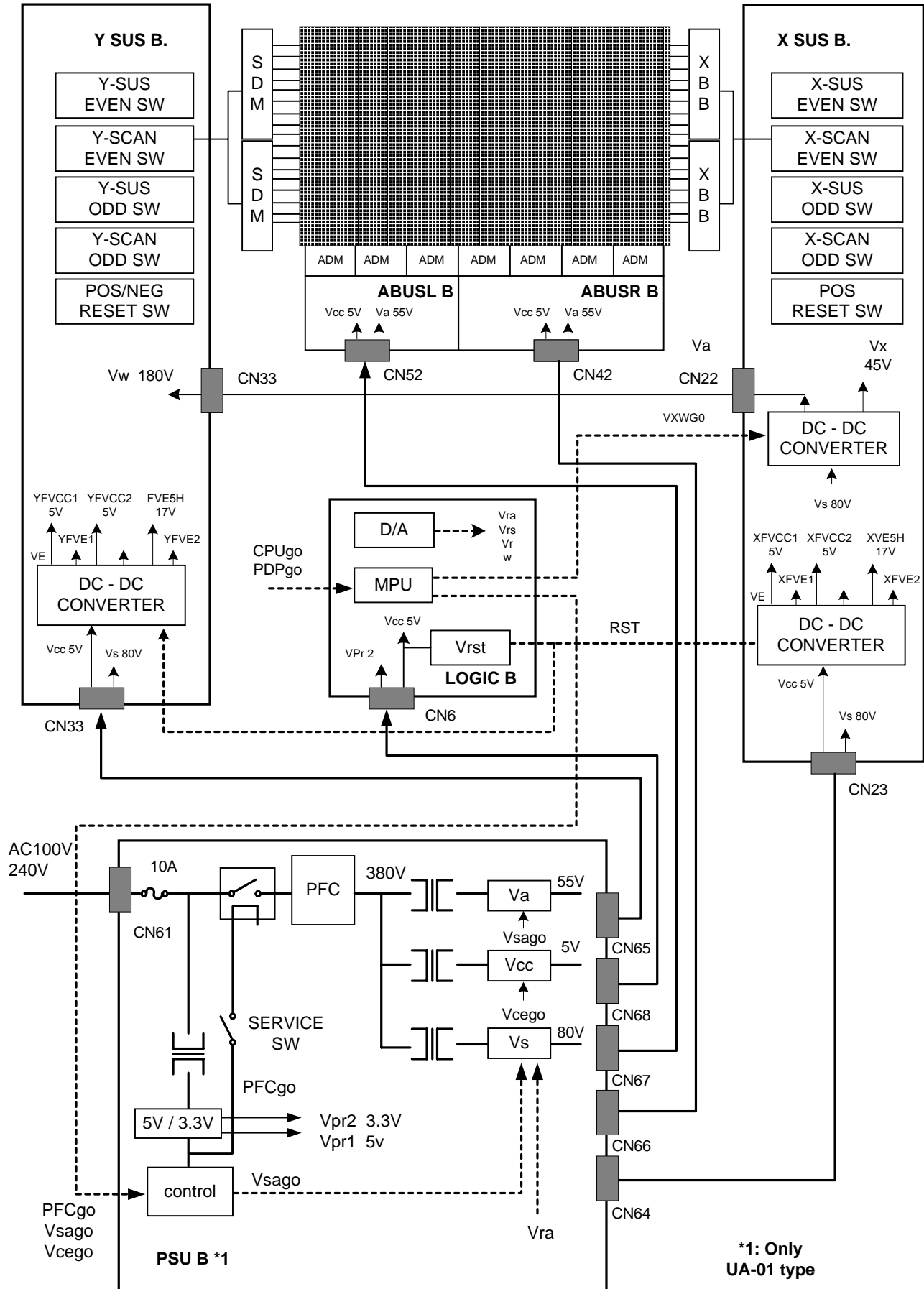


PDP (AVC-20) Video Block Diagram

Audio Video Control Unit



POWER BLOCK DIAGRAM



*1: Only UA-01 type

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SECTION NINE

(9)

KNOWN FAILURES AND FIXES

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PLASMA KNOWN FAILURES AND FIXES

(1) Symptom: NO PICTURE, BOTH POWER LEDs GREEN

- **Cause 1:** A/V UNIT DEFECTIVE
- **Cause 2:** 8 PIN CONNECTOR PINS BENT

(2) Symptom: NO PICTURE, A/V POWER LED GREEN, PD UNIT LED RED

- **Cause:** A/V UNIT DEFECTIVE
- **Details:**
 - ◇ This dealer has a store stock. They have a green light on the AVC BOX and a RED light on the PD unit. There is no sound or video on the PDU. They have checked all connections and they are hooked up correctly.
 - ◇ Have the store do a test on the unit by disconnecting the DVI and 8 pin den cable and pressing the center power switch in the middle of the display for 5 seconds. If the unit powers on, then it could be the AVC box or the AV Interface board. If it does not power up it would be the Power Supply board.
 - He did this test and the PDU did power up and started flashing through the colors.
 - ◇ With the Interface cables connected and pressing the Power button on the PDP unit, the PDP did not come on.

(3) Symptom: 3 INCH WIDE SECTION BLANKED OUT TOP TO BOTTOM IN THE CENTER OF PICTURE

- **Cause:** ABUS-L AND ABUS-R PWBS REPLACED
- **Details:**
 - ◇ Servicer called to state that he is working on store-stock Plasma TV model # 42HDT20. The monitor displays the image from the AVC but has a three inch wide section of top to bottom vertical line's.
 - ◇ Trouble shot this with the Training Handbook received from Alvie Rodgers. Sending the left and right ABUS assembly's as the Servicer had indicated the lines were not shifted to the right of left but exactly in the center.
 - ◇ LEFT ADDRESS BUS PUB
 - ◇ RIGHT ADDRESS BUS PUB
 - ◇ Remember, the ABUS-L affects the Right hand side of the picture Vertically and the ABUS-R affects the Left hand side of the picture Vertically.

(4) Symptom: PDP NO POWER, LED BLINKING ORANGE. A/V UNIT LED GREEN.

- **Cause:** CHECK CONNECTIONS FROM A/V UNIT TO PDP

(5) Symptom: PDP LED BLINKING ORANGE, A/V UNIT LED RED

- **Cause:** DVI Cable from PDP unit plugged into RGB2 on A/V Unit. Remove AC Power, connect the DVI interface cable from the A/V unit correctly, after 20 seconds, re-apply power.

(6) Symptom: VERTICAL LINE (TOP TO BOTTOM) ON RIGHT or LEFT SIDE

- **Cause:**
 - ◇ ABUS-L PWB OR LOGIC PWB for RIGHT SIDE
 - ◇ ABUS-R PWB OR LOGIC PWB for LEFT SIDE
- **NOTE:**
 - ◇ Be sure to install the ABUS Board first and test the unit. If the problem is eliminated, then installation of Logic PWB isn't necessary.

Continued on Next Page

PLASMA KNOWN FAILURES AND FIXES

(7) Symptom: WILL NOT DISPLAY AN "HD" 1080i INPUT SIGNAL (Out of Sync)

- **Cause 1:** Distribution Amplifier
- **Details:**
 - ◊ Dealer was running satellite out of a distribution box.
 - ◊ The dealer called because the Plasma Display Unit (PDU) will not display HDTV.
 - ◊ When the PDU is turned on to HDTV the screen has static lines in the screen. The unit will display an Analog signal just fine.
 - ◊ If he puts up the menu on Input 1 or 2, the menu will work fine.
 - ◊ When he ran the satellite directly to the unit, the unit began working properly.
 - ◊ Distribution Amplifier (Audio Authority Model 985U®)
 - ◊ Replaced Distribution Amplifier and all units worked perfectly.
- **Cause 2: RCA VGA to Component Adapter**
- **Details:**
 - ◊ There was a call with a problem with a number of Hitachi dealer stock sets including the above plasma unit. All of the Hitachi sets display a distorted image when connected to a HD source thru component
 - ◊ video. He mentioned that the signal originated from a RCA DTC 100 was then adapted to component, and sent thru distribution boxes to the TVs. I asked if he had tried bypassing the distribution boxes. He said this did not work. He tried different RCA adaptors and only has one HD source in the store. He also mentioned that a DVD connected with component works fine.
 - ◊ Fix: Change the VGA to Component Adapter.
 - ◊ There are different Sync Outputs for different adapters, set-top-boxes, etc... The sync needed is bi-level or tri-level sync (50uSec) not standard sync (100uSec).

(8) Symptom: HORIZONTAL LINE (SIDE TO SIDE)

- **Cause:** X-SUS or Y-SUS PWB

(9) Symptom: NO PICTURE, NO ILLUMINATION DURING PANEL TEST, FRONT LED OK

- **Details:**
 - ◊ History as follows:
 - ◊ 1. We sent out a Power PWB, didn't fix it.
 - ◊ 2. We sent out a Power Filter PWB, didn't fix it.
 - ◊ 3. We sent out a AV PWB, didn't fix it.
 - ◊ 4. We MRA'd the unit.
 - ◊ On the PDP, I re-swapped all the PWB's Hitachi had sent out, plus the Logic PWB, with known working PWB's.
 - ◊ No fix.
 - ◊ Looking a little deeper, I took some readings on a working unit and on this one, I determined that there was a missing voltage. This voltage (Vw) is generated on the X-SUS PWB, and is used on both the X-SUS PWB as well as on the Y-SUS PWB. This voltage should have been about +160Vdc. It's very simple to take this reading. *(See Pictures on the Next Page)*
- In the past, for no display problems, we have usually sent out the Power PWB, since so many voltages are generated on that PWB, including the Va and Vs supplies. However, in the future I suggest that we have the tech check this voltage, in case the Power PWB doesn't fix the unit; this will possibly save an MRA, but since this unit (AVC and PDP together) had multiple problems, it was a likely candidate for MRA anyway.
- **Cause:** Bad X-SUS PWB.
 - ◊ Bottom Line: The AVC unit had a defective MSC/FLEX PWB, and the PDP had a bad X-SUS PWB.

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PLASMA KNOWN FAILURES AND FIXES

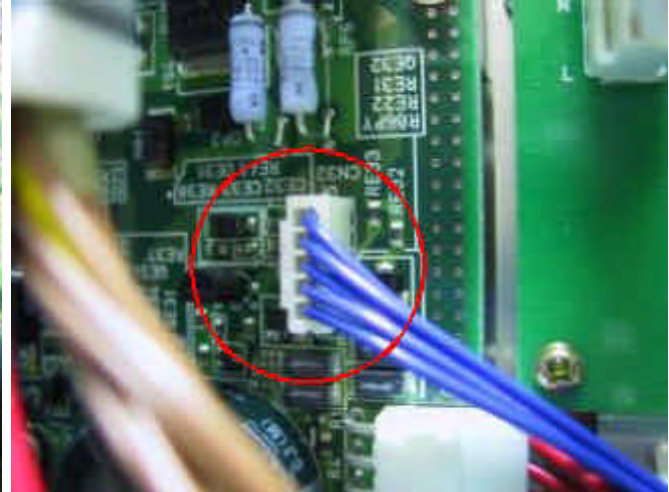
(9) Symptom: NO PICTURE, NO ILLUMINATION DURING PANEL TEST, FRONT LED OK

Continued from Previous Page

5 Pin Connector on X-SUS PWB,
CN-22 going to Y-SUS PWB



5 Pin connector on Y-SUS PWB, CN32, pin5 (at top)
should have had approx +160Vdc.



Vs, Va, Vw, Vx, voltage label on PDP
(Bottom Left on a 42HDT20)
(Top Left on a 32HDT20)



Continued on Next Page

PLASMA KNOWN FAILURES AND FIXES

(10) Symptom: NO PICTURE, NO ILLUMINATION DURING PANEL TEST, FRONT LED IS NOT ILLUMINATED

- **Details:** 42HDT20B
 - ◊ **Cause:** POWER SUPPLY PWB.
- **Details:** 32HDT20B
 - ◊ **Cause:** POWER SUPPLY PWB and FILTER PWB.

(11) Symptom: PICTURE SHIFTED TO THE RIGHT WHEN USING A SAMSUNG SET TOP BOX MODEL SRTS160 AND DVI INPUT.

- **Details:**

Make sure the Plasma is set up to **MODE 1** under the RGB 2 Set Up menu. Only when this Mode is switched to Mode 1, customer can ADJUST the HORIZONTAL POSITION adjustment and move the picture to the left. This will center the display coming out of the Samsung STB when connected to the Hitachi Plasma DVI connection. In fact, just make sure this switch is always in MODE 1 when customers are feeding DVI into any of our Plasma units.

SECTION 10

(10)

**PWB
USAGE
EXPLANATION**

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32HDT20M PWB FUNCTION EXPLANATION

PWB	USAGE and/or FUNCTION
FILTER PWB	The Filter PWB is responsible for converting the AC input voltage to DC and then making this DC voltage available to the Power Supply PWB. There are also regulators on the Filter PWB.
POWER PWB	The Power Supply PWB takes the Raw B+ from the Filter PWB and then generates different Power Supplies for the Plasma Unit. This PWB generates Vs, Va, Vw and Vx power supplies as well as the Power Supplies to the Logic, L and R ABUS PWBs, A/V PWB, X and Y SUS PWBs.
X-SUS PWB	The X-SUS PWB is responsible for controlling the signals output to the Plasma Panel. It controls the Left to Right (Horizontal Lines) top to bottom. The Hitachi Plasma Panel utilizes ALIS (Alternate Lighting of Surface) architecture. Think of this in a sense like interlacing. So the output from the X-SUS PWB controls every other horizontal line (Left to Right) of the entire Plasma Panel. There are two large connectors that connect directly to the Plasma Panel. This PWB also had several DC to DC converters that provide voltage to the Y-SUS PWB.
Y-SUS PWB	The Y-SUS PWB is responsible for controlling the signals output to the Plasma Panel. It controls the Left to Right (Horizontal Lines) top to bottom. The Hitachi Plasma Panel utilizes ALIS (Alternate Lighting of Surface) architecture. Think of this in a sense like interlacing. So the output from the X-SUS PWB controls every other horizontal line (Left to Right) of the entire Plasma Panel. There are two large connectors that connect directly to the Plasma Panel.
LOGIC PWB	The Logic PWB is responsible for receiving the Video signals received by the Audio / Video PWB and converting them to the proper format for use by the Plasma Panel. (Pixel Mapping).
AUDIO / VIDEO PWB	The Audio / Video PWB receives all inputs from the A/V Unit via the 8 pin den and the DVI combination cable. This PWB develops the video signals to be used by the Logic PWB. This PWB also develops the Audio signals sent to the Audio Outputs and the Sub Woofer received from the 8 pin din. Communication with the AV Unit is routed through the PWB as well. The Logic PWB receives this communication for Customer Controls. This PWB also has the Soft Touch Power Button use to turn the Plasma Panel On and Off or with the A/V Unit disconnected, and this button is held in for more than 3 seconds, runs the Plasma Panel Test sequence.
L-ABUS PWB	The L-ABUS PWB (Left as viewed from the Back), takes the signals developed by the Logic PWB and drives the Plasma Panel Vertically. The L-ABUS controls the Plasma Panel's Right hand side. (As view from the Front). The L-ABUS PWB has three connectors that connects directly to the Plasma Panel Glass and control three vertical (top to bottom) sections of the Right Side.
R-ABUS PWB	The R-ABUS PWB (Right as viewed from the Back), takes the signals developed by the Logic PWB and drives the Plasma Panel Vertically. The R-ABUS controls the Plasma Panel's Left hand side. (As view from the Front). The L-ABUS PWB has three connectors that connects directly to the Plasma Panel Glass and control three vertical (top to bottom) sections of the Left Side.
AC CHOKE CAN	This can contains the main AC Choke coil assembly. This choke is responsible for preventing high frequency components that are generated in the Plasma Panel from being radiated back into the AC Line. Note too that the AC Vacation Switch is located here.

42HDT20M PWB FUNCTION EXPLANATION

PWB	USAGE and/or FUNCTION
FILTER PWB	The Filter PWB for the 42" plasma is much smaller than the one for the 32". The Filter PWB is responsible for converting the AC input voltage to DC and then making this DC voltage available to the Power Supply PWB.
POWER PWB	The Power Supply PWB takes the Raw B+ from the Filter PWB and then generates different Power Supplies for the Plasma Unit. This PWB generates Vs, Va, Vw and Vx power supplies as well as the Power Supplies to the Logic, L and R ABUS PWBs, A/V PWB, X and Y SUS PWBs.
X-SUS PWB	The X-SUS PWB is responsible for controlling the signals output to the Plasma Panel. It controls the Left to Right (Horizontal Lines) top to bottom. The Hitachi Plasma Panel utilizes ALIS (Alternate Lighting of Surface) architecture. Think of this in a sense like interlacing. So the output from the X-SUS PWB controls every other horizontal line (Left to Right) of the entire Plasma Panel. There are two large connectors that connect directly to the Plasma Panel. This PWB also had several DC to DC converters that provide voltage to the Y-SUS PWB.
Y-SUS PWB	The Y-SUS PWB is responsible for controlling the signals output to the Plasma Panel. It controls the Left to Right (Horizontal Lines) top to bottom. The Hitachi Plasma Panel utilizes ALIS (Alternate Lighting of Surface) architecture. Think of this in a sense like interlacing. So the output from the X-SUS PWB controls every other horizontal line (Left to Right) of the entire Plasma Panel. There are two large connectors that connect directly to the Plasma Panel.
LOGIC PWB	The Logic PWB is responsible for receiving the Video signals received by the Audio / Video PWB and converting them to the proper format for use by the Plasma Panel. (Pixel Mapping).
AUDIO / VIDEO PWB	The Audio / Video PWB receives all inputs from the A/V Unit via the 8 pin den and the DVI combination cable. This PWB develops the video signals to be used by the Logic PWB. This PWB also develops the Audio signals sent to the Audio Outputs and the Sub Woofer received from the 8 pin din. Communication with the AV Unit is routed through the PWB as well. The Logic PWB receives this communication for Customer Controls. This PWB also has the Soft Touch Power Button use to turn the Plasma Panel On and Off or with the A/V Unit disconnected, and this button is held in for more than 3 seconds, runs the Plasma Panel Test sequence.
L-ABUS PWB	The L-ABUS PWB (Left as viewed from the Back), takes the signals developed by the Logic PWB and drives the Plasma Panel Vertically. The L-ABUS controls the Plasma Panel's Right hand side. (As view from the Front). The L-ABUS PWB has four connectors that connects directly to the Plasma Panel Glass and control four vertical (top to bottom) sections of the Right Side.
R-ABUS PWB	The R-ABUS PWB (Right as viewed from the Back), takes the signals developed by the Logic PWB and drives the Plasma Panel Vertically. The R-ABUS controls the Plasma Panel's Left hand side. (As view from the Front). The L-ABUS PWB has four connectors that connects directly to the Plasma Panel Glass and control four vertical (top to bottom) sections of the Left Side.
AC CHOKE CAN	This can contains the main AC Choke coil assembly. This choke is responsible for preventing high frequency components that are generated in the Plasma Panel from being radiated back into the AC Line. Note too that the AC Vacation Switch is located here.

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